

# FIELD EVALUATION OF UNDERGROUND STORAGE TANK SYSTEM LEAK DETECTION SENSORS

- Appendices -

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# **Phase I Testing Summary**(Field Evaluation of Veeder-Root Discriminating Sensors)

#### Introduction

Sensors are used in a variety of places within a UST system to detect a release of product. For double-wall systems, they are either located inside the secondary containment (sumps and under dispenser pans) or in the space between the primary and secondary containment of the tank or piping, known as the interstitial space. Field experience has shown that due to numerous design, installation, and maintenance issues these areas are often not kept clean of water intrusion or excessive condensation. This has led the industry to introduce sensors that are capable of differentiating between water and hydrocarbons. These sensors are referred to as "discriminating sensors."

Discriminating sensors can provide distinct alarms for water or product. Some even offer distinct alarms for low and high levels of water. Depending on how the control panel is programmed, a product or water (low or high level) detection can activate a warning, alarm, or pump shutdown. Typically, sensors are programmed to provide a warning when water is detected, which still allows the UST system to operate. Product detection is typically programmed to activate a fuel alarm, and may also automatically shut down the pump.

There are two basic approaches to discriminating sensors, as described in the following paragraphs. One approach to discriminating sensors is to combine two or more sensing elements into a single unit (See Figure I). This approach is well suited for sumps where surface water is prone to leak in, presenting the possibility of product floating on water. Sensing elements (most often a float switch) are used to detect low and high liquid levels. If the level rises above a preset point, the sensor notifies the operator by activating an alarm or warning message on a control panel. A hydrocarbon-sensing element (such as a product permeability sensor) is also incorporated to detect the presence of product. The combination of these multiple sensing elements into a single unit makes a discriminating sensor able to determine the presence of water versus hydrocarbons. There are several combinations of detection mechanisms that may be incorporated in a single unit to produce a discriminating sensor.

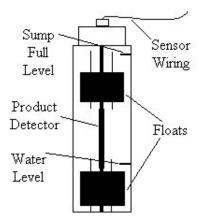


Figure I - A typical multi-element discriminating sensor with float switches and a product solubility element.

The second type of discriminating sensor uses only one detection mechanism, but is able to discern between product and other liquids based on some specific property of the liquid. Some adsistor, capacitance change, electrical conductivity, fiber optic chemical, and thermal conductivity sensors are sophisticated enough to distinguish between product and water.

### **Purpose of the Project**

This report is based on testing performed only on discriminating sensors manufactured by Veeder-Root, as they are the most prevalent in California. We initiated a field study of discriminating sensors in response to local agency concerns that some of these sensors did not appear to operate properly when annual maintenance certification and inspections were conducted. Particular items of concern brought to our attention by local agency inspectors were:

- The inability of discriminating sensors to detect a layer of hydrocarbon-based product (i.e. gasoline) floating on top of water and to properly distinguish between water and product;
- The inability of polymer-based hydrocarbon detecting elements to alarm in a reasonable amount of time; and
- The inability of polymer-based hydrocarbon detecting elements to return to effective operation (recover) after exposure to hydrocarbons.

While this project was initially designed to address the aforementioned local agency concerns, we enlisted the help of discriminating sensor manufacturers and local agency inspectors to expand the scope of the study. The scope of the study included:

- Evaluating the functionality of discriminating sensors used in California (in response to the above listed concerns of local agency inspectors);
- Checking the adequacy of field-testing procedures for discriminating sensors (or work with manufacturers to develop field-testing procedures if they are not already available);
- Determining if discriminating sensors in the field perform consistently with the specifications outlined in their third-party evaluations; and
- Determining if the third-party evaluation protocol currently used is suitable for the sensor types tested using that protocol.

### **Coordination of the Field Testing**

Since the focus of the testing was on the performance of sensors in the field, it was necessary to conduct testing at operating facilities where the sensors are installed. Three local agencies representing a cross section of California's UST population local regulatory governments volunteered to assist with this project. The City of Santa Ana, City of Santa Monica, and City of Oakland helped us to identify facilities within their jurisdictions that were using Veeder-Root discriminating sensors. In order to minimize the impact on owners, operators, and local agencies, we scheduled our field testing to coincide with the required annual inspections. The maintenance contractor performed the testing for the sensors while completing all the other scheduled annual certification work. Manufacturer's representatives were on hand to observe the testing, assist with the advanced setup and diagnostic features of the sensor control panel, and to answer technical questions.

### **Testing Procedure**

In order to test the sensors during this evaluation, Veeder-Root prepared a draft testing procedure. We reviewed and provided comments on the draft test procedures, which were then

modified by Veeder-Root and re-submitted as a second draft. The second draft was the testing procedure used in our field evaluation. Modifications were made throughout the study, as deemed necessary by our staff on site. Modifications were included to minimize station downtime, and to test possible improvements to the protocol (such as the cleansing of sensors in white gas<sup>1</sup> to accelerate recovery of polymer strips.)

The basic test procedure was to immerse the discriminating sensor in fuel, water, or a fuel/water mixture to see if it alarmed appropriately (e.g., water and/or fuel). We modified the procedure by using a stopwatch to determine the length of time between sensor immersion and alarm, and the length of time for the sensor to recover after being removed from the liquid. We also noted the type and the depth of the liquid in which a sensor was immersed, as well as the type of alarm (fuel, water, or both water and fuel) the sensor registered.

Test procedures varied slightly between sensor models, due to differences in detection mechanisms. Veeder-Root's discriminating sensors can be classified in two general families based upon their fuel-sensing mechanisms: Ultrasonic sensors (model 794380-341), and Polymer Strip Sensors (all other models tested). Table I lists the Veeder-Root discriminating sensors tested in this study, including the mechanisms each sensor model uses to determine the presence of liquid and/or fuel, and the testing procedure used in our study.

**TABLE I - Veeder-Root's Discriminating Sensors** 

Model Number	Application	VR Test Procedure	Water Sensing Mechanism	Fuel Sensing Mechanism
794380-320	Dispenser Pan	A	Ultrasonic	Polymer Strip
794380-350	Sump (Pump or Piping)	A	Ultrasonic	Polymer Strip
794380-322	Dispenser Pan	A	Float Switch	Polymer Strip
794380-352	Sump (Pump or Piping)	A	Float Switch	Polymer Strip
794380-360	Fiber Trench	A	Ultrasonic	Polymer Strip
794380-361	Fiber Trench	Α	Ultrasonic	Polymer Strip
794380-362	Fiber Trench	Α	Ultrasonic	Polymer Strip
794380-341	Interstitial	В	Ultrasonic	Capacitance Change

#### **Data Collection**

#### City of Santa Ana

SWRCB staff, local agency inspectors, maintenance contractors, and Veeder-Root representatives collected data for this project. Data collection began in Santa Ana in August 2000, where the local agency inspector, maintenance contractor, Veeder-Root representatives were present at each testing site. SWRCB staff was present at some of the Santa Ana sites. Veeder-Root representatives recorded the test data in Santa Ana. This data was forwarded to us for analysis. (See Table II for a summary of this data.)

<sup>&</sup>lt;sup>1</sup> Since the time of testing we have heard from other manufacturers of polymer strip sensors that this practice, although common among service technicians, may have an adverse effect on the polymer strip sensor's continued functionality. SWRCB staff does not recommend cleansing sensors with white gas unless specifically instructed to do so by the sensor manufacturer.

SWRCB staff did not always witness testing in Santa Ana. Additionally, we were still refining the scope of data to be collected, testing procedures, and protocol for data collection. For these reasons, results of testing in Santa Ana were usually considered only when making general observations and conclusions in this report, not in making any specific calculations. An exception to this is test data for model 794380-341 sensors. Santa Ana test data for this model has been included in the calculations of this report, since the sample size in Santa Monica and Oakland was so small. The local agency inspector present at all Santa Ana sites furnished us with his reports on the sites equipped with model 794380-341 sensors, and this data was used in calculating pass/fail rates for that model.

### City of Oakland and City of Santa Monica

Testing was conducted in Oakland and Santa Monica in October and November 2000. Local agency inspectors, Veeder-Root personnel, service technicians, and SWRCB staff were present at all facilities tested. SWRCB staff recorded all test data. Upon completion of testing, the data collected from Oakland and Santa Monica was compiled in a data table, which is summarized in Table III.

Table II - Summary of Veeder-Root Test Data from Santa Ana\*

Dates of Testing	August 21 <sup>st</sup> –25 <sup>th</sup> , 2000
Number of Facilities Tested	8
Number of Sensors Tested	(model 794380-208) = 18
	(model 794380-320) = 3
	(model 794380-341) = 13
	(model 794380-350) = 26
	(model 794380-352) = 5
	(model 794380-362) = 1
	(model  794380-40x) = 10
<b>Total Number of Sensors Tested</b>	76

<sup>\*</sup>Detailed test information not available for Santa Ana facilities

Table III - Summary of Test Data from Oakland and Santa Monica

Number of Facilities Tested	18
Number of Sensors Tested	(model  794380-320) = 2
	(model  794380-322) = 1
	(model  794380-341) = 6
	(model 794380-350) = 8
	(model 794380-352) = 49
	(model 794380-360) = 1
Total Number of Sensors Tested	67
Pass/Fail Data for Model 794380-341	4 passes, 2 failures
Range of Response Times in Fuel and Fuel/Water Mix (794380-350)	3:26 to 42:50 (min:sec)
Range of Recovery Times in Fuel and Fuel/Water Mix (794380-350)	19:49 to 70:40 (min:sec)
Range of Response Times in Water (794380-352)	2 to 18 seconds
Average Response Time in Water (794380-352)	8 seconds
Range of Response Times in Fuel and Fuel/Water Mix (794380-352)	4:59 to 12:10 (min:sec)
Average Response Time in Fuel and Fuel/Water Mix (794380-352)	7 minutes, 15 seconds
Range of Recovery Times in Fuel and Fuel/Water Mix (794380-352)	0:27 to 52:29 (min:sec)
Average Recovery Time in Fuel and Fuel/Water Mix (794380-352)	17 minutes, 26 seconds

#### **Discussion**

Since the operating mechanism and testing procedure of the Veeder-Root model 794380-341 sensor are different than all the other sensors in our study, it is reasonable to divide the "discussion" section into two parts: one part for the 794380-341 (ultrasonic mechanism), and one for all of the other sensors in our study (polymer-strip mechanism).

### Ultrasonic Mechanism (Veeder-Root Model 794380-341)

Our testing showed the 794380-341 interstitial fiberglass tank sensor performed unsatisfactorily. Eleven of 20 model 794380-341 sensors failed when tested in the field<sup>2</sup>. Usually, the sensors detected the presence of liquid, but were unable to discriminate between fuel and water. Veeder-Root determined the failures are due to a faulty solder joint within the sensor, and is planning to make design changes to eliminate the problem. Since the sensor cannot reliably discriminate between fuel and water, Veeder-Root intends to reclassify the current 794380-341 sensor as non-discriminating<sup>3</sup>.

When testing the 794380-341 sensors in Santa Ana, we observed that they often came out of the tanks wet. The moisture was a clear, odorless and somewhat gooey film. When the film dried, it became milky white<sup>4</sup>. There appeared to be moisture in the interstitial spaces of the tanks these sensors are monitoring, but not enough to activate an alarm. Follow-up information from Santa Ana indicates that these sensors had to be cleaned before they would alarm properly when tested, and that this is a common occurrence observed by inspectors during routine sensor field certifications.

## Polymer-Strip Mechanism (Veeder-Root Models 794380-320, 794380-322, 794380-350, 794380-352, 794380-360, 794380-361, and 794380-362)

The polymer-strip discriminating sensors consist of three separate sensing elements. The low and high liquid detectors are float switches or ultrasonic sensors depending on the model. The product-sensing element is a polymer strip that absorbs hydrocarbons. The strip is imbedded with small particles of conductive material (See Figure II). As the strip absorbs hydrocarbons, the material expands and the strip becomes less conductive (e.g. the resistance rises). When the resistance reaches a certain level (for Veeder-Root sensors this is set at approximately 250 k $\Omega$  to 500 k $\Omega$ ) an alarm is activated.

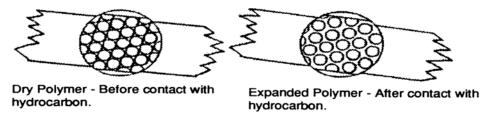


Figure II – Polymer strip used in discriminating sensors

<sup>&</sup>lt;sup>2</sup> Includes data supplied by the local agency inspector present at Santa Ana test sites.

<sup>&</sup>lt;sup>3</sup> Veeder-Root has completed reclassification of the model 794380-341 sensor since this summary was originally prepared.

<sup>&</sup>lt;sup>4</sup> The local agency inspector present at these facilities was concerned that the liquid may include resin or adhesive used in construction of the fiberglass tanks where these sensors are installed.

The low and high-level liquid sensors proved to be generally effective. They typically activated a liquid alarm in less than the third-party specified time. On the few occasions that a sensor did not respond properly, the problem was usually diagnosed as faulty wiring or improper programming of the console and not a design problem.

While our field-testing showed the low and high level liquid sensors to be effective, several issues concerning the polymer strip were raised which may be cause for concern and further investigation. Other issues, such as control panel configuration and testing protocols, were also brought to light in the course of field-testing. The following paragraphs discuss these concerns in detail.

1. Response and recovery times of the polymer strip element when exposed to fuel were sometimes excessive, and not always consistent with third-party claims. Primary concerns include the length and variation of response and recovery times, as discussed below:

### (a) Length of Response Times

The fuel alarm is activated only after enough fuel has permeated the polymer strip to raise its electrical resistance to a value of  $250~k\Sigma$ . The time required to reach the necessary electrical resistance varied from 5 to 12 minutes, with an average of just above 7 minutes. Typically the resistance in the strip did not change appreciably for several minutes. In the event of a catastrophic leak, this response time could lead to large amounts of fuel in the dispenser pan or containment sump. As the liquid level reaches the high-level liquid sensor a high level water alarm will sound, but it could still be many minutes before the polymer strip reacts to the fuel and activates a fuel alarm. This would be a major concern if the system is not configured for turbine shutdown when the high level water alarm is activated.

### (b) Variation of Response Times

With the wide variation in response times between sensors of the same model tested in the same product, it is difficult to say exactly how long a polymer-strip sensor should typically take to alarm once exposed to fuel. This makes it difficult to establish field-testing guidelines, or to determine if a sensor is actually non-functional or just slow to respond.

### (c) Length of Recovery Times

Recovery times often exceeded the third-party value of 17.17 minutes. Values ranged from under 1 minute to over 52 minutes, with an average of more than 17 minutes. Like a sponge in water, the strip swells when exposed to fuel. It must completely dry out and return to its original shape in order to come out of alarm. This can take quite awhile, depending on how saturated the strip is and how volatile the liquid is. In the interest of time, our test procedure called for a minimum amount of fuel, and for the sensor to be removed from fuel as soon as it alarmed. We even experimented with removing the sensor from fuel before it had alarmed in hopes of decreasing recovery times. Even so, the recovery times were high. Although the test protocol used in this study did not include long-term immersion of sensors in fuel, it is reasonable to believe that sensors immersed in fuel for extended periods of time (as would be the case in the event of an actual leak) would take even longer to recover, or may not recover at all.

2. Response and recovery times seem to vary with weather conditions.

### (a) Warm and dry vs. cool and wet conditions

Although it is difficult to substantiate with hard data due to the inconsistency of our testing procedures<sup>5</sup>, the polymer strips tended to respond and recover more quickly in warmer weather. We observed that sensors tested in the sun and sensors tested during dry conditions recovered more quickly than sensors tested in rainy or colder weather. This may be due to the fact that in colder or more humid weather fuel is less volatile.

### (b) Very cold conditions

The correlation between temperature and response/recovery time may become a major factor at extremely low temperatures. In our field evaluation, we did not test sensors in freezing conditions, so we do not know if the polymer strips are still effective at these temperatures. Is fuel volatile enough during freezing temperatures for the sensor to absorb the hydrocarbons and go into alarm? We posed this question to Veeder-Root in a letter. Nowhere in the third-party evaluation is temperature or humidity considered. We simply do not know how effective these sensors will be in extreme temperatures.

In addition to the polymer strips, we are also concerned about the functionality of float switches in freezing conditions, especially those monitoring shallow sumps and shallow under-dispenser containment boxes. It may be possible for condensation to freeze on a float switch and render it inoperable.

3. The frequency of data transmittal between the sensor and the control console is a factor in response and recovery times.

The console (e.g., TLS 350) "looks" at the status of each sensor or leak detection element in the UST system. It cycles through each sensor and element in the system before returning to the beginning. If multiple sensors and elements are built into the programming, it may take more time for the console to return to a particular sensor. As a result, facilities with a large number of sensors may take longer to activate an alarm at the console than those with a small number of sensors.

4. Alarm Settings and Pump Shutdown Features.

Many of Veeder-Root's polymer-strip discriminating sensors have three different types of alarms: a low liquid alarm, a high liquid alarm, and a fuel alarm.

- The low liquid alarm is triggered by a float switch or ultrasonic mechanism located at or near the bottom of the sensor housing. This mechanism will "trip" whenever it is covered with fluid. It does not discriminate between water and fuel. This mechanism activates a warning (yellow light) at the control panel.
- The high liquid alarm is also triggered by a float switch or an ultrasonic mechanism, which is located a few inches from the top of the sensor housing.

<sup>&</sup>lt;sup>5</sup> In warm weather, the thin layer of fuel used on top of water evaporated completely before the sensor alarmed. The service person conducting the test had to add more fuel several minutes into the testing, causing very long response times. Therefore the correlation between temperature and response time which might otherwise have been evident is not readily recognized.

Again, this mechanism cannot discriminate between water and fuel. This mechanism activates an alarm (red light) at the control panel.

• A fuel alarm is triggered by a polymer strip that runs the length of the sensor housing, from the bottom of the sensor to the top float switch. Unless the polymer strip detects hydrocarbons, alarms from this mechanism are considered an indication of water intrusion. This mechanism activates an alarm (red light) at the control panel.

Both warnings and alarms are designed to alert the operator that there is something wrong with the UST system. Each requires investigation, and should receive an appropriate response from the operator. Warnings and alarms may also be programmed to activate pump shut-down, which turns off the turbine so that the UST cannot operate. Pump shut-down is generally only done with alarms.

If warnings or alarms are ignored and the liquid level exceeds the height of the top float switch, the sensor no longer detects additional fuel or water entering the sump. The sensor becomes ineffective and no longer provides leak detection; therefore, pump shut down at the high level alarm is a must.

### 5. High Vapor Mode

Another feature of the Veeder-Root control panel is the "High Vapor Mode." This operating mode is designed for use in areas where background levels of hydrocarbon vapors are high enough to activate the fuel alarm, even though the UST system is not leaking. This may be due to a previous release of product, or possibly the materials and adhesives used in the construction of the UST itself may release vapors. "High Vapor Mode" is a tool used to eliminate false alarms. When the console is configured in "High Vapor Mode," the sensor will not sound a fuel alarm unless it detects both the presence of liquid and hydrocarbons. The low liquid alarm mechanism must be triggered and the resistance in the polymer strip must be high enough to trigger a fuel alarm.

Although the sensors we tested in "High Vapor Mode" seemed to be generally effective, they have not been third-party certified for operation in "High Vapor Mode" versus "Low Vapor Mode."

### 6. Lack of Field Testing Procedures.

Although each manufacturer may provide its own manual of procedures for testing discriminating sensors, there are several different tests a technician can run. Some agencies require a test of the low and high liquid alarms only. Some agencies require testing the sensors in fuel and water separately. And some agencies require each sensor to be tested in fuel, in water, and in a fuel/water mixture.

Based on the results of our field testing, we determined that it is necessary to periodically test all sensors in fuel. Even though the consoles are designed to run diagnostics on the sensors, the consoles do not always recognize problems with sensors or their wiring. We encountered two or three sensors that were either not programmed properly or had wiring problems. These programming or wiring problems were only discovered through

physical testing of the sensors in fuel. We might also benefit from testing sensors in a water/product mixture, since it simulates more accurately conditions encountered in parts of the UST system that are prone to water intrusion.

### 7. Degradation of Polymer Strips

Our testing provided no conclusive information as to the long-term reliability of polymerstrip sensors in harsh environments, or after repeated/prolonged exposure to hydrocarbons. Results of testing showed a wide variation in the response and recovery times for the polymer strip sensors. In many cases these times exceeded the third-party specifications.

The manufacturers of polymer strips claim the strips are testable and reusable, but each time the strip comes in contact with fuel, it apparently either retains some of the volatile compounds within its material or its elasticity is compromised after repeated/prolonged hydrocarbon exposure. Once exposed to fuel, the sensor is no longer "good as new." Eventually, the sensor will degrade so much that either it may not recover from an alarm condition (the resistance will not drop to the point that it comes out of alarm), or the probability of false alarms will be very high. We do not know how many testing cycles a sensor can reasonably accommodate.

### 8. Volatility of Stored Product

The polymer strip is most readily activated by volatile hydrocarbons, with unleaded fuel and white gas producing the most rapid responses. The sensors also recovered from exposure to these fuels fairly consistently. Diesel fuel would activate an alarm, but not nearly as quickly as the more volatile unleaded fuel. Recovery times were very slow. Veeder-Root suggested cleaning sensors exposed to diesel fuel with white gas in order to speed up recovery. Technicians told us that sensors exposed to diesel must often be airdried for days, and even then, sometimes never recover.

Although we encountered some waste oil UST systems being monitored by Veeder-Root discriminating sensors, we did not test the sensors in waste oil. Veeder-Root's sensors are not third-party evaluated for use in waste oil applications. We are concerned that waste oil may not be volatile enough to trigger an alarm from polymer strip sensors.

### 9. Third-Party Protocol is Inappropriate for Polymer Strip Sensors

Third-party testers have been using standard liquid point detection protocols to evaluate the polymer-strip sensors. These protocols are usually designed for mechanical or electrical switching devices that do not use chemical reactions like the polymer strips. It may be necessary to develop a protocol that takes into account the unique aspects of polymer-strip sensors. Ability to alarm and recover in a variety of environmental conditions should be assessed. The impact of repeated exposure of these sensors to fuel on response time and recovery time should also be evaluated.

APPENDIX II Workplan for Phase II of the Field Evaluation

### SWRCB Sensor Field Evaluation Workplan (Phase II) – July 3, 2001

### **Team Members**

Project Supervisor: Shahla Farahnak, P.E.

Project Coordinator: Scott Bacon Assistant Coordinator: Raed Mahdi

Field Testing Staff: Raul Barba, Eric Luong, and Jennifer Redmond

### **Purpose of the Project**

This project is intended to evaluate the functionality of liquid and vapor sensors used to monitor UST systems. The focus will be on "real world" effectiveness, with testing performed at operating facilities where the sensors are currently installed. The study is designed to:

- Evaluate the functionality of sensors used in California;
- Check the adequacy of field-testing procedures for sensors (or work with manufacturers to develop field-testing procedures if they are not already available);
- Determine if sensors in the field perform consistently with the specifications outlined in their third-party evaluations; and
- Determine if the third-party evaluation protocol currently used is suitable for each of the sensor types evaluated with that protocol.

### **Coordinating Field Efforts**

In order for us to test at a UST facility, several people must be present or notified. At a minimum, this will include SWRCB staff and a service technician on site, as well as notification of the facility owner/operator. Additionally, local agency inspectors and sensor manufacturers may be present. We plan to work with local agencies and maintenance contractors to coincide our testing with the required annual maintenance inspections already scheduled at the facilities

### **Data Collection Process**

- *Field Testing Method* Experienced service technicians will conduct the testing. They will access sensors in sumps, tank interstice, dispenser pans, excavation linings, and monitoring wells. The sensors will be immersed in water at a depth corresponding to their third-party evaluation. In addition, discriminating sensors will be tested in fuel and/or a fuel/water mixture.
- **Data Recording** Our staff will observe the testing and record data. We will record sensor response and recovery time, as well as information about the sensor make, model, and application. Additionally, we will record data about the facility and the condition of the area the sensor is located in. Through careful collection and analysis of data, we hope to determine what factors may adversely effect sensor performance.
- *Industry Professional's Survey* In addition to the data collected from field-testing, we will survey experienced maintenance technicians and inspectors. Their responses will be used to supplement our field data and give us a clearer picture of sensor effectiveness.

### **Safety Considerations**

Qualified contractors will perform all hands-on testing. They have been trained to safely deal with the equipment and hazardous substances found at the facilities where our testing will take place. Our staff will only observe and record data, but all applicable standards of safety will be adhered to. This includes, but is not limited to, proper securing of the work area from traffic hazards.

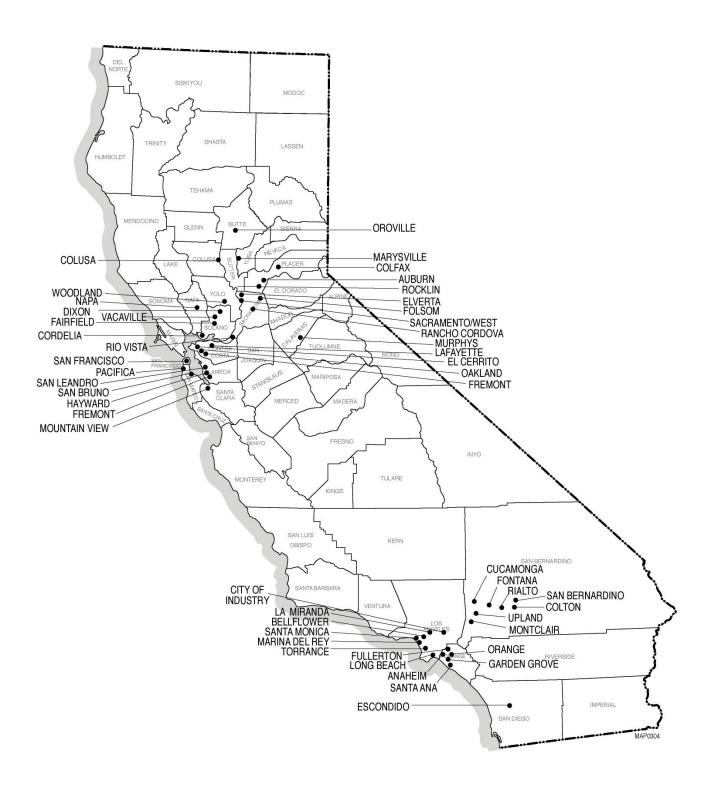
### **Final Report/Summary**

A thorough report will be completed at the end of field-testing. It will detail our testing activities and present the data collected from both the tests and completed surveys. In addition, the report will state conclusions and recommendations based on the results of our study.

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APPENDIX III Location of Facilities Included in the Field Evaluation

### Location of Facilities Included in the Field Evaluation of Underground Storage Tank System Leak Detection Sensors



# SWRCB SENSOR FIELD EVALUATION SITE DATA COLLECTION FORM

Site # \_\_\_\_\_

Date:	Ti	me Testing Begins:		<b>Time Testing Ends:</b>			
<b>Facility Name:</b>	•		Address:				
<b>Facility Ownersh</b>	ip: Major Oil	☐ Independ	ent Oil   G	Sovernment Agency			
	Other:						
T G	1 1 11 1 =	D 11 W 11 =	C. 1 - F1	1 - D - H 1			
Tank Type: Si	ingle-Wall □	Double-Wall □	Steel □ Fiberg	glass   Dry   Hydrostatic			
Piping Type: S	Single-Wall	Double-Wall □	Pressurized	Suction			
		glass   Flex	Fiber Trencl	h □			
# of Tanks:		# of Sumps:		# of Dispensers:			
STAFF							
SWRCB Staff Pr		T					
Local Agency Sta	aff		Agency:				
Present T. 1	() () 1 ()	TD 4					
Service Technicia	an(s) Conducting	g lest:	V				
Contractor: Manufacturer's			Years in Industry: Manufacturer:				
Representatives:			Manufacturer:				
Kepresentatives.							
WEATHER CO							
Temperature at			•	t End of Testing:			
Humidity at Star General		C1 1 □	Humidity at En				
Conditions:	Sunny   D	Cloudy $\square$	Windy □	Light Rain □			
Conditions:	Heavy Rain	$\Box$ Fog $\Box$	Other:				
<b>COMMENTS:</b>							
COMMENTS.							

### SWRCB SENSOR FIELD EVALUATION, SENSOR DATA COLLECTION FORM

<b>EQUIPMEMNT INFO</b>	RMA'	ΓΙΟΝ								
Sensor Make:						Sensor Model:				
Sensor Serial #:						or Manufacture I				
Control Panel Make	:				Control Panel Model:					
Control Panel Serial	<b>#:</b>				Control Panel					
					M	anufacture Date:				
Operating Principle:		at Switch	0	Ultrason			Permeable		Optical	
D'''		acitance Chan					Conductiv	Listed in		etivity
Discriminating? Y	N	Continuou	S: Y	N	K	eusable? Y N		Listea in	LG-11	3? Y N
APPLICATION INFO	RMA	ΓΙΟΝ								
Sensor Location:	Tank Ir	nterstice	]	Pump Su	mp 🗆	Fill S	ump 🗆		UD	$C \square$
7	Vapor '	Well 🗆		Groun	dwater	Well □	Trench Li	ner 🗆		
Is Sensor at Lov	west P	oint?	Is V	Wiring (	Connec	ted Properly?	Total	# of Sens	ors	
Yes No	NA	<b>\</b>		Yes	No		Recor	ded on th	is Fori	m:
Sensor Location		Is Clean and	Drv 🗆	Co	ontains	Water	Contains 1	Debris 🗆	Bri	ine-Filled □
(check all that apply)		Contains Pro	-				Has Stron			
Sensor is Monitoring	for	Regular Unle					Premium			Water
the Presence of	101	•					Other:	Omeaded		water $\square$
		Diesel	Brine	e 🗆						
Tank/Sump/UDC		Steel			/Plastic		rglass 🗆			
-	Monitored by Sensor is Membrane/Liner □ HDPE □ Other:									
Tank/Sump/UDC Mai	nufact	urer:								
WATER TEST (Low)										
Water Height:						Response Time				
Recovery Time						Pump Shut-Dov	vn	Yes	No	NA
Alarm Activated:	Water	Product	Both	None		Test Result:		Pass		Fail
WATER TEST (High)										
Water Height:						<b>Response Time</b>				
Recovery Time						Pump Shut-Dov	vn	Yes	No	NA
•	Water	Product	Both	None		Test Result:		Pass		Fail
								- 1122		
PRODUCT TEST						<b>Product Used:</b>				
Product Height:						Response Time				
Recovery Time:						Pump Shut-Dov	vn	Yes	No	NA
	Water	Product	Both	None		Test Result:	VII	Pass	110	Fail
Alai iii Activateu.	v ater	Troduct	Dom	TVOILE		1 est Result.		1 433		1 411
PRODUCT ON WATE	RTE	ST								
Water Height:						Product Thickn				
Response Time:						Recovery Time:				
Alarm Activated: \	Water	Product	Both	None		Pump Shut-Dov	vn	Yes	No	NA
Product Used:						Test Result:		Pass		Fail
After testing this sensor COMMENTS:	r was:	Repaired <sup>1</sup>	Rep	laced 🗆	Re	-Tested <sup>2</sup> □ Re-l	Installed			

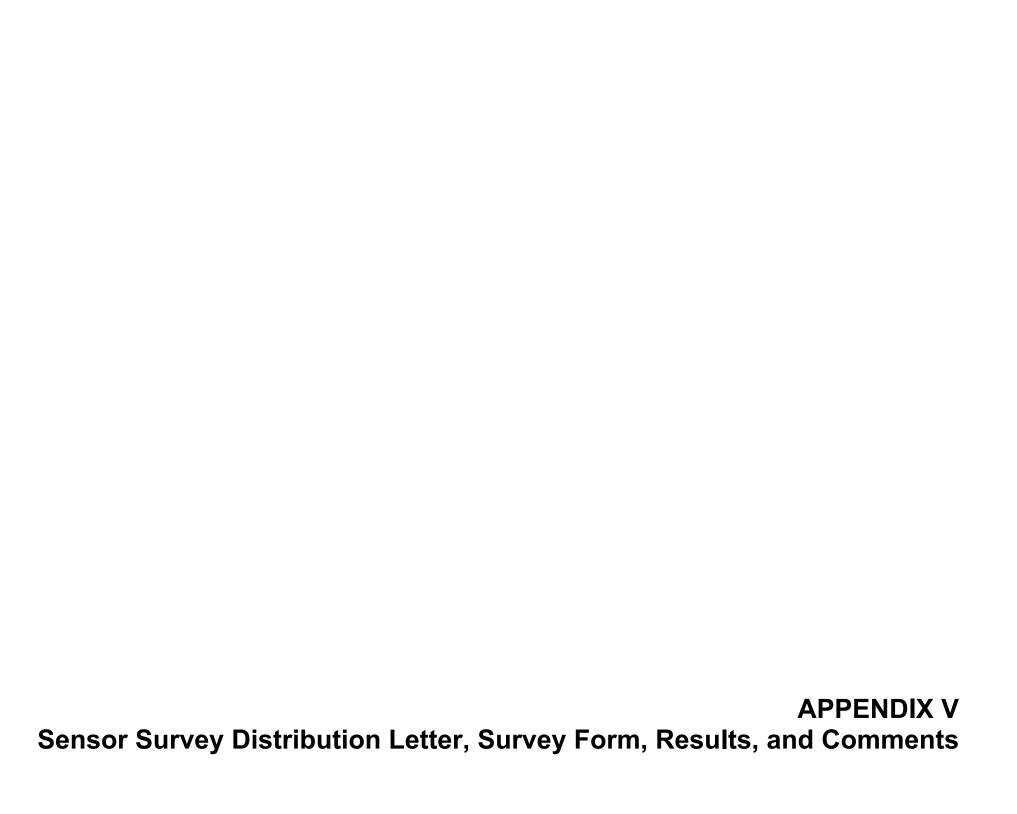
 $<sup>^{1}</sup>$  Describe repairs in Comments section  $^{2}$  If the sensor is re-tested, record test data in another sensor form and attach it to the back of this form

### **Veeder-Root Discriminating Sensor Field Performance Test**

Site	Addres	ss:										Date:				
Tes	ting Co	ntractor:						SWRC	B Staff:							
		onditions						Diamet	er of test a	apparatu	ıs (in.): _		Site ID #	:		
		High W	ater Lev	el			Fuel			Ì		Water/Fu	el Mixtur	e		Pass
Sensor Model	Water Level (in.)	Resp Time to Alarm (mm:ss)	onse Alarm Type (WFN)	Recovery Time (mm:ss)	Fuel Level (in)	Time in Fuel (mm:ss)	Responsible Time to Alarm (mm:ss)	onse Alarm Type (WFN)	Recovery Time (mm:ss)	Water Level (in.)	Fuel Thickness (in.)	Time in Liquid (mm:ss)	Responsible Time to Alarm (mm:ss)	onse Alarm Type (WFN)	Recovery Time (mm:ss)	Or Fail?

Co	omments:			
-				

- 1) Sensor Location: T1 to T4 are sensors in tanks 1-4, S1 to S4 are sensors in the turbine sumps of tanks 1-4, additional sensor locations should be included in the "comments" section of this form.
- 2) Alarm Type: W = Water, F = Fuel, N = None. Include both W and F if applicable.
- Times: All times will be taken from the moment the sensor is placed in the fluid. The clock will not be zeroed between alarm activation and recovery.
- 4) Indicate any sensors that were replaced, noting the model # of the old and new sensors as well as the reason for replacement.



### **State Water Resources Control Board**



### **Division of Clean Water Programs**

1001 I Street • Sacramento, California 95814 • (916) 341-5871 Mailing Address: P.O. Box 944212 • Sacramento, California • 94244-2120 FAX (916) 341-5808 • Internet Address: http://www.swrcb.ca.gov



October 24, 2001

TO: Interested Parties

#### SURVEY FORM FOR SENSOR FIELD STUDY

We are sending this letter to you, as someone who may have expertise in the performance of the various sensors used in UST systems. We are concerned about the performance of these sensors, specifically those in tank-top sumps, tank annular spaces, and under dispenser containment. As you know, their performance is critical in detecting leaks. Therefore, we have initiated our own study to evaluate their effectiveness under actual operating conditions.

We plan to visit 200 operating UST facilities and collect data on sensor performance. However, we recognize that our field study is limited and would be incomplete without input from those who have valuable first-hand experience with these sensors. Therefore, we are requesting your assistance to complete the enclosed survey form and return it to us. This will allow us to incorporate your knowledge and experience into our study. We estimate it will take approximately 30 minutes to complete the entire survey, however we are interested in your views even if you can only complete a portion.

Please distribute the survey to anyone in your organization who routinely works with UST leak detection sensors. This includes, but is not limited to, service technicians, inspectors, installers, and environmental managers. Please return the completed surveys by **November 15, 2001** to:

**Attention: Scott Bacon** 

**State Water Resources Control Board Department of Clean Water Program** 

P.O. Box 944212

Sacramento, CA 94244-2120

Fax: (916) 341-5808

If you prefer, you may complete and submit the survey online at:

http://www.calcupa.net/support/index.htm

If you have any questions regarding this survey, please contact Scott Bacon at (916) 341-5873 or email: bacons@cwp.swrcb.ca.gov.

Sincerely,

- ORIGINAL SIGNED BY -

Shahla Dargahi Farahnak, P.E., Chief Engineering Unit 2 Underground Storage Tank Program

Enclosure

### UST SENSOR STUDY SURVEY

#### STATE WATER RESOURCES CONTROL BOARD

(Please answer all the questions that are applicable based on your experience in the field)

**Information provided by:** – (Leave blank if you prefer to submit this survey anonymously) Name: Company/Agency: Address: Telephone: **GENERAL INFORMATION 1.** What is your affiliation? ☐ Local Agency Inspector ☐ Technician ☐ Consultant ☐ Owner/Operator  $\Box$  Other (*Specify*) 2. How many years of experience do you have in the UST field? **3.** Average number of UST facilities you inspect/service monthly? □ Not applicable OVERALL SENSOR INFORMATION 4. Do you perform/require a functional test (i.e. accessing the sensors and activating an alarm by flipping them over, immersing them in liquid, etc.) of all sensors during the annual UST monitoring equipment certification?  $\square$  Yes  $\square$  No 5. What percentage of the sensors you encounter in the field are failing the functional tests?  $\Box$  < 5% □ 5-10% □ 10-20% □ 20**-**30% □ 30-40% □ 40**-**50% □ >50% **6.** What percentage of the sensor failures are due to the following factors: a) Poor design:  $\square < 5\%$ □ 5-10% □ 10-20% □ 30-40% □ 20**-**30% □ 40-50% □ >50% b) Installation:  $\square < 5\%$ □ 5-10% □ 10-20% □ 20**-**30% □ 30-40% □ 40**-**50% □ >50% □ 5-10% □ 10-20% c) Maintenance: □ <5%  $\Box 20-30\%$ □ 30-40%  $\Box > 50\%$  $\Box 40-50\%$ d) Programming: □ <5% □ 30-40% □ 5-10% □ 10-20% □ 20-30% □ 40-50% □ >50% e) Tampering:  $\square < 5\%$ □ >50% □ 5-10% □ 10-20% □ 20-30% □ 30-40% □ 40**-**50% f) Other:  $\Box 5-10\% \quad \Box 10-20\%$ □ <5% □ 20-30% □ 30-40% □ 40**-**50% □ >50% 7. Sensor failure is most common in: ☐ Steel Tanks ☐ Dry Interstice Fiberglass Tank ☐ Wet Interstice Fiberglass Tank ☐ Tank-Top (pump/fill) Sumps ☐ Under Dispenser Containment ☐ Location is not a factor in sensor failure

Appendix V, Survey Page 1 of 3

### **SENSOR COMPARISON**

**8.** Please complete this section to the best of your knowledge:

	Float switch	Polymer strip	Optical 1	Prism   U	ltrasonic	Conductivit	ty Capacitance change
% failure rate							
Indicate most common reason(s) for failure							
*Failure Reasons:		ogramming Poor Design		faintenance = Please in		Installation	T = Tampering
9. What specific	make(s) and	/or model(s	) of sensor ar	e <b>most</b> reli	able?		
10. What specific	make(s) and	/or model(s	) of sensor ar	e <b>least</b> reli	able?		
DISCRIMINA	TING SENS	SORS					
11. What percent	age of the ser	nsors you us	e/inspect/serv	vice are dis	scriminatir	ng sensors?	
<ul><li>Tank Interst</li><li>Turbine Sun</li><li>Under Dispe</li></ul>	nps: □ <5%	□ 5-10%	□ 10-20%	□ 20-30%	□ 30-4	0% □ 40-	
12. Based on you discriminating	r experience, g sensors?	discriminat	ing sensors a	re		_ when comp	pared to non-
☐ <b>More</b> reliat	ole	□ <b>Less</b> reli	able		<b>ually</b> relia	able	
13. For discrimin	ating sensors	using polyr	ner strip, wha	at is the typ	oical time	for each of th	e following?
a) <u>response in</u> □ <30sec □			□ 3-5min	□ 5-10m	in 🗆 🗆	10-20min	□ >20min
b) <u>recovery ir</u> □ <1min □		<del></del>	□ 5-10min	□ 10-20r	nin 🗆 🗆	>20min	□ Not reusable
c) response in $\square < 30 \text{sec}$		□ 1-3min	□ 3-5min	□ 5-10m	in 🗆 🗆	10-20min	□ >20min
d) <u>recovery ir</u> □ <1 min □		□ 5-15min	□ 15-30min	□ 30-60r	nin □>	>60min	□ Not reusable

Appendix V, Survey

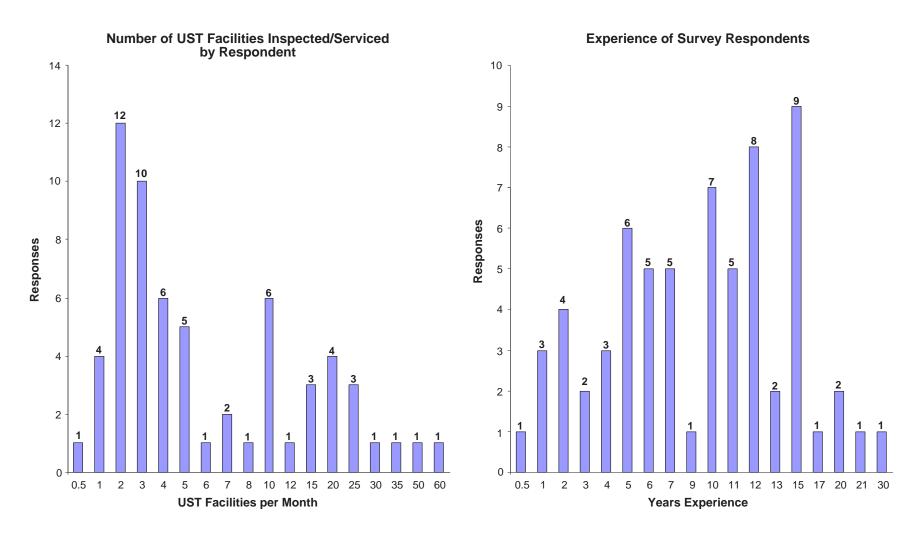
14. Is there a change in response times for polymer strip sensors after repeated exposure to fuel?
<ul> <li>□ Response time for polymer-strip sensors increases after repeated exposure to hydrocarbons.</li> <li>□ Response time for polymer-strip sensors decreases after repeated exposure to hydrocarbons.</li> <li>□ Response time for polymer strip sensors does not change after repeated exposure to hydrocarbons.</li> </ul>
15. Which of the following methods do you most often use/require when testing discriminating sensors?
☐ Test in <b>water</b> only ☐ Test in <b>product</b> only ☐ Test in <b>both</b> product and water ☐ I do not test/require testing of discriminating sensors
PUMP SHUT-DOWN FEATURE
<b>16.</b> What is the typical time delay between sensor activation and pump shut-down?
□ <5sec □ 5-10sec □ 10-30sec □ 30-45sec □ 45-60sec □ 1-2min □ >2min
17. For sensors programmed for pump shut-down, what percent of them shut down the pump?
□<5% □ 5-10% □ 10-20% □ 20-30% □ 30-40% □ 40-50% □>50
<b>18.</b> What are the most common reason(s) for failure of the pump shut-down?
<ul> <li>□ Programming</li> <li>□ Relay box (Equipment problems)</li> <li>□ Installation</li> <li>□ Other (Specify)</li> </ul>
ADDITIONAL INFORMATION
19. What changes can be made to improve sensor reliability?
20. Do you have any other comments you would like to share with us?

Appendix V, Survey

### **SWRCB Sensor Field Evaluation, Survey Results**

71 local agency inspectors and service technicians responded to the survey. The following tables summarize their responses to a variety of questions on UST leak detection sensors.

### ABOUT THE RESPONDENTS



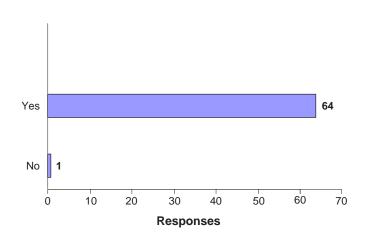
Appendix V, Survey Results

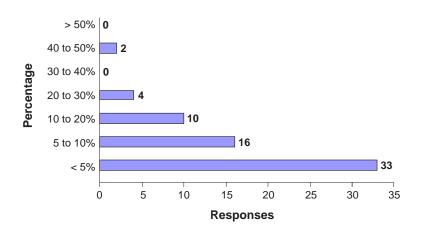
Page 1 of 6

### **GENERAL SENSOR INFORMATION**

### Do you Require Functional Test of Sensors?

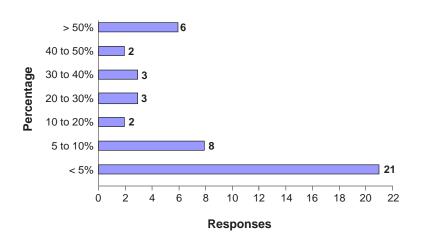
### **Percentage of Sensors Failing Functional Test**

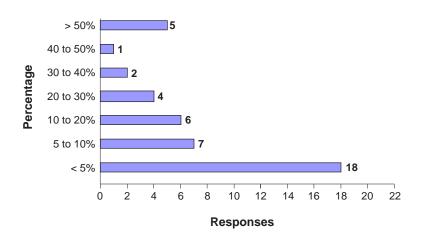




What Percentage of Sensor Failures are Due to Poor Design?

What Percentage of Sensor Failures are Due to Poor Installation?

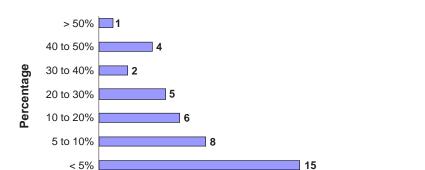




Appendix V, Survey Results

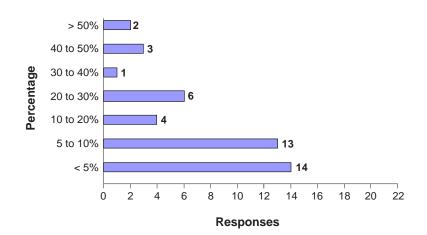
Page 2 of 6

What Percentage of Sensor Failures are Due to Poor Maintenance?



0

What Percentage of Sensor Failures are Due to Improper Programming?



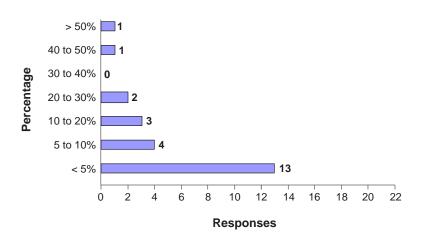
What Percentage of Sensor Failures are Due to Tampering?

Responses

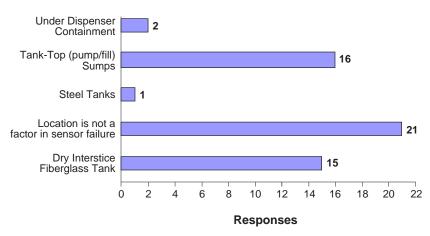
12

14 16

18



### **Location Where Sensor Failure is Most Common**



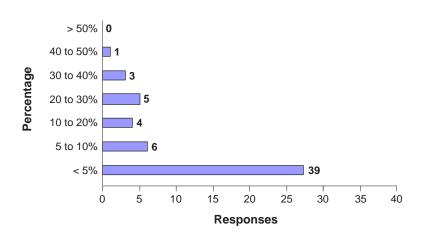
Appendix V, Survey Results

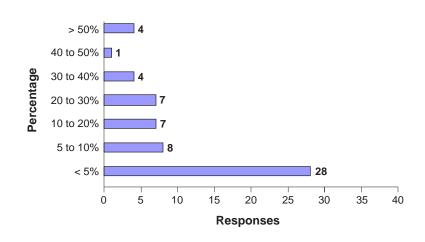
Page 3 of 6

### DISCRIMINATING SENSOR INFORMATION

### **Percentage of Discriminating Sensors in Tank Interstice**

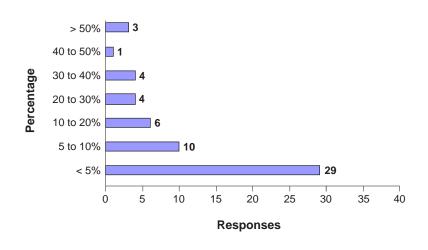
### **Percentage of Discriminating Sensors in Turbine Sumps**

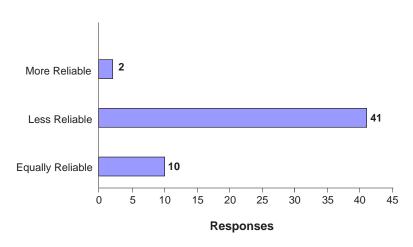




### Percentage of Discriminating Sensors in UDC

Reliability of Discriminating Sensors as Compared to Non-Discriminating



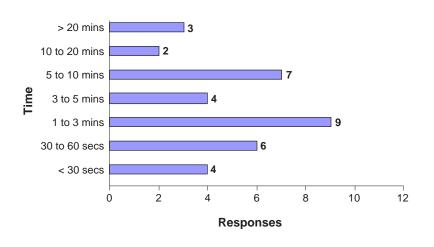


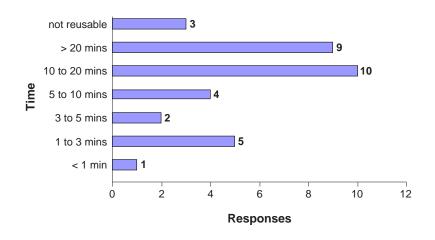
Appendix V, Survey Results

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### **Discriminating Sensor Response Time in Unleaded Fuel**

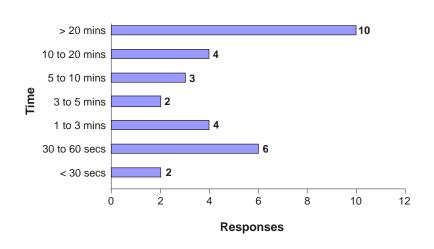
### **Discriminating Sensor Recovery Time in Unleaded Fuel**

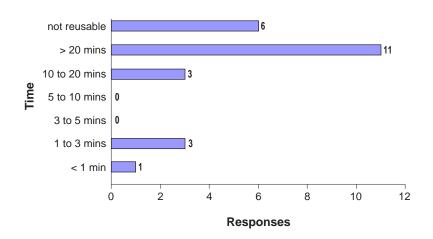




### **Discriminating Sensor Response Time in Diesel Fuel**

**Discriminating Sensor Recovery Time in Diesel Fuel** 



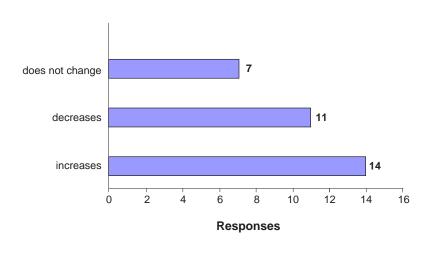


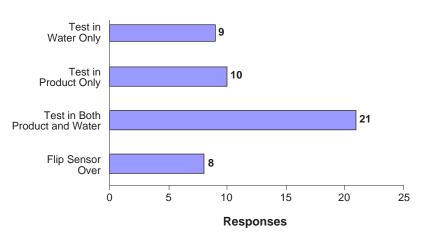
Appendix V, Survey Results

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### Changes in Response Time for Polymer Strips After Repeated Exposure to Fuel

### **How are Discriminating Sensor Being Tested?**

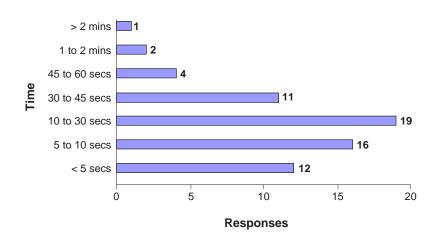


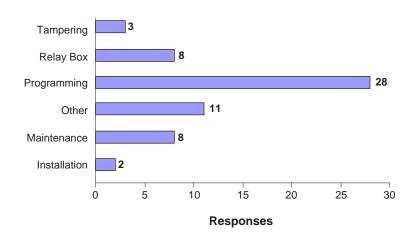


### **PUMP SHUT-DOWN INFORMATION**

### **Pump Shut-Down Delay Time**

### Reason for Failure of Pump Shutdown





Appendix V, Survey Results

Page 6 of 6

# Online Survey Comments and Recommendations for the Sensor Field Evaluation of Underground Storage Tanks:

This is a compilation of comments and recommendations we received from our survey participants. These comments represent the views of the participants surveyed and may not reflect the opinions of the SWRCB.

- Discriminating sensors must be able to be tested in the actual product and must clear within a few minutes
- Improve maintenance of sensors and replace outdated ones.
- The polymer strip type sensor appears to be a poor design for immediate identification of a leak. Remove this type from the approval list.
- Do not allow the use of sensors associated with the MSA Tankguard. I'm not sure, but I believe that they are polymer strip discriminating sensors. They have an extremely low response and recovery time of about 15-20 minutes. Also the sensitivity of the MSA Tankguard can be adjusted and always seems to need to be adjusted at each inspection. The alarm may not sound when the sensor is being tested in liquid, but then sound when it is not being tested. I do not trust the reliability of these sensors.
- Operator training, proper maintenance and tamper proofing.
- Eliminate discriminating sensors altogether in annular spaces. Heck, eliminate them everywhere. They are only good for sumps and containment areas that are so poorly constructed that liquid intrusion is a constant problem. Repairing the sumps would be a better solution to liquid intrusion problems.
- The positive shut down sump sensors are plastic and they stick open. Some type of new stick product is needed.
- You might want to require that all sensors be replaced regularly every 2-3 years.
- Eliminate discriminating sensors unless they have <5sec-response time. They need to be designed so that corrosion and sticking do not occur. Needs to be such that maintenance is minimized since this is only done annually.
- Require quarterly maintenance and inspection of sensors.
- Make them simple and easy to place. The Tri-State feature is best on systems that have no maintenance crew.
- Overall experience with discriminating sensors is minimal, but due to survey set cases/problems, we do not allow or will approve them for use in the city. Result is problematic.
- Better design, stronger materials, and no resistors at sensor end.
- Improve design on brands listed in question 10. Discriminating sensors are not practical. I do not test them due to recovery time. Sometimes they do not recover.
- I don't know if it is possible, but what if they made a sensor that was non-stick so that sludge would not hold the float, making it stuck. The contact points would also need to be sludge proof.
- Better installation practices. Sensors are not being hung at the correct location, i.e. at the bottom of the tank or sump.

- Eliminate discriminating sensors or improve technology. Operate and test sensors under various simulated conditions. Improve technology of annular float sensors in FG tanks to improve accessibility/visual inspection/simulated testing.
- Be there at the annual maintenance checks. You learn a lot, see a lot of the important violations and disrupt the business only once. The entire focus of my inspections is the leak detection systems for piping and tanks. They must work. Operators do not like to do leak detection manually. Pushing toward all electronic monitoring is essential for the future. Get the operators out of it. Have the ATG print out the monthly .2 gph-passing test for tanks at least once a month automatically. Then the operator saves this record for the inspection.
- Testers hate to test the discriminating sensors with product because they know they will have problems getting them cleared, if at all. If the sensors won't clear, then it must be replaced, and tested. On one occasion, the technician did not have a discriminating sensor replacement with him so he had to call his shop and have someone drive one out to the site. This kept that product offline for several hours. The facility operator was not happy.
- Get rid of sacrificial sensors, and require secondary containment for all piping!!!
- My primary objective in completing this survey is to expose the problems that I have encountered in
  trying to test the sensors for the MSA Tankguard system. All other sensors that I have encountered are
  sufficiently reliable.
- The compatibility of simple contact switch sensors with the control panels is not a major issue or an operational problem. The use of discriminating sensors is a major issue even when these sensors are used with a compatible control panel.
- We hardly see discriminating sensors. The alarm needs to go through a central alarm system in which case we will know of any release. Tampering defeats the purpose of monitoring. We find improper positioning of the probe/ raised probe 80 % of the sites. Water intrusion a real problem.
- A tank system that is properly constructed and maintained should never have liquid intrusion problems and therefore there is no need for discriminating sensors.
- Owners need a good, simple manual on the tank system components, requirements, and
  responsibilities: like "straight talk on tanks" in more detail. So many stations change hands and so
  many employees are dueless, that comprehensive explanation of UST's is desperately needed to start to
  get an unformed constituency.
- Bravo box float mechanisms for dispenser containment monitoring were not mentioned in this survey but have about a 50% failure rate due to debris or loose chains. SFSFD water tests all float monitored dispenser pans.
- Sensor reliability or rather the lack there of, has caused local agencies to all other leak detection and testing requirements to UST's. The confidence level in the sensors functioning properly at any given time is low, Because of this the confidence in our UST programs goal of preventing and detecting releases is also somewhat low. Why spend a lot of time and resources when the devices are unreliable? Also, this didn't address mechanical systems. The Bravo Float system has chronic problems with not functioning properly after more than a year. The float does not leave very much room for sidewalls of channels so dirt freezes the movement. Tampering by loosening chains is extremely common. We dislike this design.
- Phasing out existing monitoring systems. I.e. pollulert, petrometer, leak-x, petrovend, etc. Notion current LG-113 should be an eventually to start planning for now.

- Discriminating sensors add approximately 10 min. per sensor for testing and returning to operability. That adds about 2 hours to a standard gas station monitoring certification inspection.
- Question 13(d)- recovery time for diesel fuel is greater than 60 minutes.
- Please remove discriminating sensors from approved method. They are not reliable and/or do not sense for reasonable system monitoring (if located in sump bottom with water in sump a full leak will not be detected if the water level is above the sensor). Question 7-Sensor failure is most common in Tank Top (pump/fill) Sumps and Under Dispenser Containment.
- This survey should allow free-text answers. Some pick-list choices are inadequate. At the very least, there should be a "unknown" response.
- In the past when we arrived on site for an inspection, the maintenance contractor or operator may have already tested and replaced any faulty sensors. This will skew the data you collect from inspectors, indicating higher performance rates.
- People raising probes due to surface water infiltration via rain or steam cleaning the parking lot, which violates many laws.
- Alternate technologies should be available for positive shutdown, which do not rely on the relay boxes.

### Sensor Field Data Tables

### List of Acronyms

Acronym	Meaning
MR	Sensor is manually reset after an alarm
MSA	Mine Safety Appliances
NA	Not applicable to the sensor being tested
NP	Not programmed for pump shut-down
NT	Not tested
PSD	Pump shut-down
Rec	Recovery time (in seconds)
Resp	Response time (in seconds)
UDC	Under-dispenser containment
Unk	Unknown. Data was unavailable

### List of Definitions

Term	Definition
Flip Test	Sensor was tested by flipping it over
Heights	All liquid levels are reported in inches
High Test	High-level water testing
Low Test	Low-level water testing. For single-level
	sensors tested in water, test data will be
	recorded in this column
Product	Sensor was tested in product
Site ID #200	The 67 sensors tested during Phase I (Veeder-
	Root discriminating sensors) are included in
	this database under Site ID# 200
Times	All response and recovery times are reported
	in seconds

## TABLE 1 - Summary of All Failures

Make Site ID / Model	Discriminating	At Low Point	Wired Properly	Flip Test Result	Flip PSD	Low Test Result	Low PSD	High Test Result	High PSD	Product Result	Product PSD	After testing sensor was
Alpha wire												
92 Unk	<b>✓</b>	Yes	Yes	Fail	NP	NT	NT	NA	NA	NT	NT	Re-Installed
Beaudreau												
82 406		No	Yes	NA	NA	NT	NT	NA	NA	NT	NT	Unk
10 406 Led indicator light was working	ng on sensor, indi	Yes cating that the	Yes wiring was pro	NA operly connected.	NA Sensor was rein	Fail stalled, meaning local a	NA agency has to fo	NA ollow up.	NA	NT	NT	Re-Installed
10 406 Led indicator light was working	ng on sensor, indi	Yes cating that the	Yes wiring was pro	NA operly connected.	NA Sensor was rein	Fail stalled, meaning local a	NA agency has to for	NA ollow up.	NA	NT	NT	Re-Installed
10 406 Led indicator light was working	ng on sensor, indi	Yes cating that the	Yes wiring was pro	NA operly connected.	NA Sensor was rein	Fail stalled, meaning local a	NA agency has to fo	NA ollow up.	NA	NT	NT	Re-Installed
Gilbarco												
28 PA02591144000 Sensors was replaced by contr	actor two days af	Yes ter the inspect	Yes ion.	Fail	NP	NT	NT	NA	NA	NT	NT	Replaced
28 PA02592000000 Sensors was replaced by contr	actor two days af	Yes ter the inspect	Yes ion and positive	Fail e shut down was	No rewired.	NT	NT	NA	NA	NT	NT	Replaced
28 PA02592000000 Sensors was replaced by contr	actor two days af	Yes ter the inspect	Yes ion and positive	Fail e shut down was	No rewired.	NT	NT	NA	NA	NT	NT	Replaced
98 PA02592000010 3-4 inches of water on both si	des of sump (low	No spots of tank t	Yes top).	NT	NT	Pass	Yes	NA	NA	NT	NT	Re-Installed
98 PA02592000010 2-3 inches of water on both si	des of sump (low	No spots of tank t	Yes top).	NT	NT	Pass	Yes	NA	NA	NT	NT	Re-Installed
24 PA02592000010 Relay was stuck, so the PSD f	ailed when tested.	Yes It passed wh	Yes en re-tested.	Fail	No	NT	NT	NA	NA	NT	NT	Repaired
Incon												
16 TSP-ULS Sensor was turned off when to	echnician conducto	No ed the test. Se	No ensor appears to	NT have been turne	NT d due to water in	NT the UDC. After turning	NT g the sensor on,	Fail , it passed.	Yes	NT	NT	Repaired
35 TSP-ULS The sump was full of diesel ap	oproximately 9 1/2	No 2 inches deep.	Yes The sensor wa	Pass as set at the top of	Yes the sump to avo	NT id alarming.	NT	NA	NA	NT	NT	Re-Installed
Mallory Controls												
92 Pollulert MD 241RRA Sensor failed the test, but the		Yes business.So,	Yes owner might ha	NA we to change the	NA system. Inspecto	NT r gave the owner two w	NT eeks to fix it or	NA replace It.	NA	Fail	No	Unk
All times are recorded in	seconds, height	s are recorde	ed in inches.					A	Appendix	VI, Table	1, Page 1 of	f 6

Make Site ID / Model	Discriminating	At Low Point	Wired Properly	Flip Test Result	Flip PSD	Low Test Result	Low PSD	High Test Result	High PSD	Product Result	Product PSD	After testing sensor was
MSA												
17 Tankgard 482607 Sensor initially turned off.		No n turned off d	No ue to product in	NA n the sump. Sens	NA or worked when	NT turned on; sensor not a	NT t lowest point -	NA about 8" above	NA .	Fail	Yes	Repaired
17 Tankgard 482607 Had to leave site before with		Yes e-installation	Yes of sensor.	NA	NA	NT	NT	NA	NA	Fail	No	Unk
Red Jacket												
20 Liquid Refraction Se Sensor has been pulled up d		No he fill/vapor s	Yes ump.	Pass	Yes	NT	NT	NA	NA	NT	NT	Re-Installed
Ronan												
20 LS-3 Sensor appears to be good d		No st, but appear	Yes s not to be hoo	Fail ked up to the con	No trol panel.	NT	NT	NA	NA	NT	NT	Unk
47 LS-3 Sensor would not come out		Yes g. Pump woul	No d not come on.	Fail Contractor repa	Yes ired the facility. I	NT Problem was wiring ins	NT side the building	NA g, near the contr	NA ol panel.	NT	NT	Repaired
20 LS-3 Sensor appeared to be funct		Yes n tested for co	No ontinuity, but d	Fail id not activate ar	No alarm at the pan	NT el. Tech suspects prob	NT lem with wiring	NA between senso	NA r and pane	NT il.	NT	Unk
32 LS-3 Float was stuck. Technician		Yes osen it, then s	Yes ensor went into	Fail alarm.	NP	NT	NT	NA	NA	NT	NT	Repaired
1 LS-7 The sensor could not be take	<del></del>	No erstice; theref	Yes fore the sensor	Pass was activated wit	NP thin the tank.	NT	NT	NA	NA	NT	NT	Re-Installed
Universal												
94 LALS-1 Contractor waited for 2 min		Yes response, bu	Yes never did. Ser	Fail nsor had to be rep	NA blaced.	NT	NT	NA	NA	NT	NT	Unk
95 LALS-1 Sensor was not tested becau		Yes interstitial sp	Yes pace.	NA	NA	Fail	No	NA	NA	NT	NT	Unk
94 LAVS-1		Yes	Yes	NA	NA	Fail	No	NA	NA	NT	NT	Unk
Veeder-Root												
85 794380-208 The contractor decided to st		No after it failed	Yes to respond for	Fail more than 2 min	No utes and replace i	NT t with a new sensor.	NT	NA	NA	NT	NT	Replaced
10 794380-208 Alarm activated at the contr hat the PSD is functioning	ol panel, but no pum	No p shutdown.	Yes ( printer said p	Fail ump shutdown o	No ccurred, but pump	NT continued to run. Pic	NT ture of sensor is	NA site 7 #2.). Fol	NA low up wa	NT as done on th	NT is site and In	Re-Installed spector confirmed
91 794380-208 Fill bucket was detached. St		No ct line (to pre	Yes went the flappe	NT r from shutting d	NT own the flow)	Pass	Yes	NA	NA	NT	NT	Re-Installed
All times are recorded in											1 Page 2 or	

Make Site ID / Model	Discriminati	ng At Low Point	Wired Properly	Flip Test Result	Flip PSD	Low Test Result	Low PSD	High Test Result	High PSD	Product Result	Product PSD	After testing sensor was
91 794380-208 Fill bucket was detached. Sti	ick was in the pro	No duct line (to pr	Yes event the flappe	NT from shutting do	NT own the flow)	Pass	Yes	NA	NA	NT	NT	Re-Installed
91 794380-208 Fill bucket was detached. Sti	ick was in the pro	No duct line (to pr	Yes event the flappe	NT from shutting do	NT own the flow)	Pass	Yes	NA	NA	NT	NT	Re-Installed
91 794380-208 Sensor timed out & Technici	ian had to go and	No re-set it to shut	Yes down the pump	NT .	NT	Pass	Yes	NA	NA	NT	NT	Re-Tested
91 794380-208 Fill bucket was detached. Sti	ick was in the pro	No duct line (to pr	Yes event the flapper	NT from shutting do	NT own the flow). M	Pass ost of sensors timed ou	Yes at & Technician	NA had to go and	NA re-set it to	NT shut down th	NT ne pump.	Re-Installed
91 794380-208 Sensor timed out & Technici	ian had to go and	No re-set it to shut	Yes down the pump	NT .	NT	Pass	Yes	NA	NA	NT	NT	Re-Tested
91 794380-208 Sensor timed out & Technici	ian had to go and	No re-set it to shut	Yes down the pump	NT	NT	Pass	Yes	NA	NA	NT	NT	Re-Tested
91 794380-208 Sensor timed out & Technici	ian had to go and	No re-set it to shut	Yes down the pump	NT .	NT	Pass	Yes	NA	NA	NT	NT	Re-Tested
42 794380-208 Contains a substantial amoun	nt of water.	No	Yes	Pass	NP	NT	NT	NA	NA	NT	NT	Re-Installed
76 794380-208		No	Yes	Pass	NP	NT	NT	NA	NA	NT	NT	Re-Installed
73 794380-208 Sensor was raised about 4 in	ches from the bot	No tom of the sum	Yes p.	Pass	Yes	NT	NT	NA	NA	NT	NT	Re-Installed
33 794380-208		No	Yes	Pass	NP	NT	NT	NA	NA	NT	NT	Re-Installed
33 794380-208		No	Yes	Pass	NP	NT	NT	NA	NA	NT	NT	Re-Installed
33 794380-208		No	Yes	Pass	NP	NT	NT	NA	NA	NT	NT	Re-Installed
33 794380-208		No	Yes	Pass	NP	NT	NT	NA	NA	NT	NT	Re-Installed
33 794380-208		No	Yes	Pass	NP	NT	NT	NA	NA	NT	NT	Re-Installed
33 794380-208		No	Yes	Pass	NP	NT	NT	NA	NA	NT	NT	Re-Installed
79 794380-208 Product is leaking out of the	top of the turbine	No e pump.	Yes	Pass	Yes	NT	NT	NA	NA	NT	NT	Re-Installed
79 794380-208 Product is leaking out of the	top of the turbine	No e pump.	Yes	Pass	Yes	NT	NT	NA	NA	NT	NT	Re-Installed
79 794380-208 Product is leaking out of the	top of the turbine	No e pump.	Yes	Pass	Yes	NT	NT	NA	NA	NT	NT	Re-Installed
42 794380-208 The sensor was not located a	at the lowest poin	No t in the tank. To	Yes echnician lowere	Pass d it and activetd a	Yes an alarm.	NT	NT	NA	NA	NT	NT	Re-Installed
All times are recorded in	1 1 :	1., .	1 1						. 1:		1 Page 3 of	2.6

Make Site ID / Model	Discriminating	At Low Point	Wired Properly	Flip Test Result	Flip PSD	Low Test Result	Low PSD	High Test Result	High PSD	Product Result	Product PSD	After testing sensor was
76 794380-208		No	Yes	Pass	NP	NT	NT	NA	NA	NT	NT	Re-Installed
62 794380-208 2-3 gallons of product in the s	sump. Sensor was	No raised above	Yes the product level	Pass . Sensor in pump	NP p sump was not	NT programmed to shut do	NT own pump.	NA	NA	NT	NT	Re-Installed
62 794380-208 -3 gallons of product in the s		No raised above	Yes the product level	Pass . Sensor in pump	NP p sump was not	NT programmed to shut do	NT own pump.	NA	NA	NT	NT	Re-Installed
42 794380-208		No	Yes	Pass	Yes	NT	NT	NA	NA	NT	NT	Re-Installed
85 794380-208 There was a hole in the sump, 2 psi. Fill sump is not clean		No /2" diam. Ele	Yes ectrical wiring be	Pass low penetration l	Yes lines. Hydrostati	NT c test was performed to	NT the highest per	NA netration lines a	NA t 16 minut	NT es per cycle.	NT Test at 16 psi	Re-Installed and fail if below
10 794380-208 sensors, 1 raised in sump an	d the other was a t	No he lowest poi	Yes nt. Both respond	Pass led and activated	Yes pump shut off.	NT Picture of sensor was	NT taken.	NA	NA	NT	NT	Re-Installed
88 794380-208 echnician waited for over 2 r	minutes, but senso	Yes r did not alarr	Yes n. Finally inspec	Fail tor decided to cal	No ll the test off and	NT d replace the sensor. T	NT esting was done	NA e on the new ser	NA nsor and it	NT passed.	NT	Replaced
200 794380-341	<b>✓</b>	Unk	Unk	NA	NA	Unk	Unk	NA	NA	Fail	Unk	Unk
00 794380-341	<b>✓</b>	Unk	Unk	NA	NA	Unk	Unk	NA	NA	Fail	Unk	Unk
19 794380-341 eplaced with same type of se	ensor.	Yes	Yes	NA	NA	NT	NT	NA	NA	Fail	No	Replaced
38 794380-341 ensor was tested with both u	nleaded gasoline a	Yes and waste oil.	Yes Both cases, water	NA er alarms were ob	NA served. Sensor v	NT was not approved for us	NT se in waste oil.	NA After testing, s	NA ensor was	Fail replaced and	NA it passed the	Replaced product test.
38 794380-341 ensor sets water alarm for pr	oduct test. After t	Yes esting the sen	Yes sor was replaced	NA and the new sen	NA sor was setting t	Pass he right alarm.	NA	NA	NA	Fail	No	Replaced
38 794380-341 ensor sets water alarm for pr	oduct test. After t	Yes esting, sensor	Yes was replaced an	NA d the new sensor	NA was setting the	Pass right alarm.	NA	NA	NA	Fail	No	Replaced
64 794380-341 etected product as water. Si	ince pump shuts do	Yes own for produ	Yes ect or water, Loca	NA al Agency did not	NA t require sensor	Pass to be changed. Owner	Yes will replace sen	NA sor or re-progra	NA am as non-	Fail discriminati	Yes	Unk
77 794380-341 echnician had to clean the se	ensor with a rag co	Yes mpletely (esp	Yes ecially in the sm	NA all window at ser	NA nsor's center) be	Pass fore fuel could be detec	Yes eted. After clear	NA ning sensor did	NA detect fue	Fail I.	Yes	Repaired
64 794380-341 etected product as water. Si	ince pump shuts do	Yes own for produ	Yes ect or water, Loca	NA al Agency did not	NA t require sensor	Pass to be changed. Owner	Yes will replace sen	NA sor or reprogra	NA m as non-c	Fail liscriminatin	Yes g.	Unk
77 794380-341 echnician had to clean the se	ensor with a rag co	Yes mpletely (esp	Yes ecially in the sm	NA all window at ser	NA nsor's center) be	Pass fore fuel could be detec	Yes eted. After clear	NA ning sensor did	NA detect fue	Fail l.	Yes	Repaired
77 794380-341 echnician had to clean the se	ensor with a rag co	Yes mpletely (esp	Yes ecially in the sm	NA all window at ser	NA nsor's center) be	Pass fore fuel could be detec	Yes eted. After clear	NA ning sensor did	NA detect fue	Fail I.	Yes	Repaired
84 794380-350 ensor did not come out of ala	✓ arm after being tes	Yes ted in product	Yes t, so technician r	NA eplaced it.	NA	Pass	NA	Pass	Yes	Fail	Yes	Replaced
All times are recorded in	seconds height	s are recorde	ed in inches						nnendiv	VI Table 1	l, Page 4 of	·6

Make I Site ID / Model	Discriminating	At Low Point	Wired Properly	Flip Test Result	Flip PSD	Low Test Result	Low PSD	High Test Result	High PSD	Product Result	Product PSD	After testing sensor was
84 794380-350 Technician suspected a problem		Yes at this site.	Unk	NA	NA	Pass	NA	Fail	No	Fail	No	Re-Installed
84 794380-350 Sensor alarmed, but failed PSD.		Yes he relay is su	Unk spected.	NA	NA	Pass	NA	Fail	No	Fail	No	Re-Installed
84 794380-350 Sensor did not respond during hi		Yes duct testing.	No Technician sus	NA pected wiring pro	NA oblem, since sense	Pass or was replaced but test	NA t results did not	Fail change.	No	Fail	No	Replaced
22 794380-352 Sensor's low float did not activate functinality.		No set). Sensor v	Yes was replaced by	NT the owner withou	NT ut informing the l	Fail ocal agnecy nor the cor	No ntractor who do	Pass es the routine in	Yes nspection.	NT Apparently,	NT they did not i	Re-Installed etest sensor's
200 794380-352	<b>✓</b>	Unk	Unk	NT	NT	Unk	Unk	Pass	Unk	Fail	Unk	Unk
200 794380-352	<b>✓</b>	Unk	Unk	NT	NT	Unk	Unk	Pass	Unk	Fail	Unk	
82 794380-352 Wiring malfunctioning.	✓	Yes	No	NT	NT	NT	NT	NT	NT	NT	NT	Unk
82 794380-352 Wiring malfunctioning.	✓	Yes	No	NT	NT	NT	NT	NT	NT	NT	NT	Unk
65 794390-205 Sump had oil in it. Sensor was ra		No oil, but alarn	Yes ned when techni	NT ician lowered it in	NT nto the oil. Contr	NT actor was notified to pr	NT ump out the oil	NA that day.	NA	Pass	NA	Re-Installed
46 794390-205 Sensor was raised approximately		No ttom of the su	Yes ump.	Pass	Yes	NT	NT	NA	NA	NT	NT	Re-Installed
29 794390-407 The sensor was located at the top was done & sensor was repaired.		No the access po	No ort. The pull-stri	NT ing was broken.	NT Inspector said set	NT nsor must be fixed imm	NT nediately. The s	NA ensor was not f	NA functionally	NT y tested duri	NT ng this inspec	Repaired tion. Afollow up
73 794390-407 Sensor would not go into alarm u		Yes ın shook it vi	Yes gorously. Float	Fail t was stuck. Inter	NP rstice was moist,	NT out not enough liquid to	NT o activate an ala	NA arm.	NA	NT	NT	Repaired
73 794390-407 Sensor would not go into alarm u		Yes ın shook it vi	Yes gorously. Float	Fail t was stuck.	NP	NT	NT	NA	NA	NT	NT	Repaired
81 794390-409 Sensor was wedged between the		Unk condary tank	Unk walls and canno	Fail ot be removed to	NP verify sensor type	NT e. Alarm was not set at	NT the control pan-	NA el by pulling it	NA like the pro	NT evous two ta	NT nks.	Re-Installed
81 794390-409 Sensor was wedged between the of knowing when sensor was trig	primary and sec	Unk condary tank	Yes walls and cannot	Fail ot be removed to	NP verify sensor type	NT e. Alarm was set at the	NT control panel by	NA y pulling it. The	NA e response	NT time was est	NT imated becau	Re-Installed use there was no way
51 794390-420 The sensor was missing the float.		NA made with l	Yes ocal agency and	Fail I confirmed that t	NP he technician rep	NT aired the sensor. Howe	NT ver, inspector d	NA id not peform r	NA e-inspectio	NT on.	NT	Unk
55 794390-420 This sensor is for steel tanks, and		No rapped arour	Yes and the FG tank.	Pass Local agency ins	NP structed owner to	NT replace.	NT	NA	NA	NT	NT	Unk

Make Site ID / Model	Discriminating	At Low Point	Wired Properly	Flip Test Result	Flip PSD	Low Test Result	Low PSD	High Test Result	High PSD	Product Result	Product PSD	After testing sensor was
89 794390-420 Interstitial space is full of wa		No ld not put bac	Yes ck the sensor w	Pass vithout calling the	Yes maintenance to r	NT emove water. Sensor w	NT as not at lowest	NA point and wire	NA was wrap	NT ped up.	NT	Re-Installed
99 794390-420 Waste oil contained oil/wate	_	No mp. The sens	No sor was not loca	Pass ated in the lowest	NP point.	NT	NT	NA	NA	NT	NT	
89 794390-420		No	Yes	Pass	Yes	NT	NT	NA	NA	NT	NT	Re-Installed
23 794390-420 Original sensor was stuck in		Yes se of rust on	Yes casing; sensor	Fail was replaced. Nev	NP w sensor passed	NT test.	NT	NA	NA	NT	NT	Replaced
Warrick Controls	3											
7 DLP-1-NC Sensor was sitting in water a		Yes ntractor shoo	Yes ok sensor and fl	Fail loat moved activat	NP ing the alarm. So	NT ensor passed retest after	NT 1-2 second ala	NA rm response.	NA	NT	NT	Re-Tested

## TABLE 2 - Field Data for Non-Discriminating Sensor

Sensor	Panel	Panel	At Low	Wiring	Condition		L	iquid Test	ing			F	lip Testing	g	
Location	Make	Model	Point	OK	of Location	Resp	Rec	Alarm	PSD 1	Result	Resp	Rec	Alarm	PSD	Result
Sensor M	ake: Beau	dreau													
Sensor Model	: 404			Operati	ng Principle: Float Sv	witch									
UDC	Veeder-Root	TLS-300	Yes	Yes	Clean/Dry	3	1	Product	N	A Pass	NT	NT	NT	NT	NT
Sensor Model	: 406			Operati	ng Principle: Optical										
UDC Sensor shuts off p	Beaudreau power to dispenser.	404-4 Cut-off	Yes	Yes	Clean/Dry	1	2	Both	N	A Pass	NA	NA	NA	NA	NA
UDC Sensor shuts off p	Beaudreau power to dispenser.	404-4 Cut-off	Yes	Yes	Clean/Dry	1	2	Both	N	A Pass	NA	NA	NA	NA	NA
UDC Sensor shuts off p	Beaudreau power to dispenser.	404-4 Cut-off	Yes	Yes	Clean/Dry	2	2	Both	N	A Pass	NA	NA	NA	NA	NA
UDC Sensor shuts off p	Beaudreau power to dispenser.	404-4 Cut-off	Yes	Yes	Clean/Dry	2	2	Both	NA	A Pass	NA	NA	NA	NA	NA
UDC Sensor shuts off p	Beaudreau power to dispenser.	404-4 Cut-off	Yes	Yes	Clean/Dry	2	2	Both	N	A Pass	NA	NA	NA	NA	NA
UDC	Beaudreau	404-4 Cut-off	No	Yes	Debris	NT	NT	NT	N	Г МТ	NA	NA	NA	NA	NA
UDC Led indicator ligh	Beaudreau nt was working on s	404-4 Cut-off sensor, indicating	Yes that the wiring	Yes g was properly	Clean/Dry connected. Sensor was re		NA ning loca	None al agency ha	Na s to follo		NA	NA	NA	NA	NA
UDC Led indicator ligh	Beaudreau nt was working on s	404-4 Cut-off sensor, indicating	Yes that the wiring	Yes g was properly	Clean/Dry connected. Sensor was re		NA ning loca	None al agency ha	NA s to follo		NA	NA	NA	NA	NA
UDC Led indicator ligh	Beaudreau nt was working on s	404-4 Cut-off sensor, indicating	Yes that the wiring	Yes g was properly	Clean/Dry connected. Sensor was re		NA ning loca	None al agency ha	NA s to follo		NA	NA	NA	NA	NA
UDC Sensor shuts off p	Beaudreau power to dispenser.	404-4 Cut-off	Yes	Yes	Clean/Dry	1	2	Both	N	A Pass	NA	NA	NA	NA	NA
UDC The sensor was te	Beaudreau ested in a cup for to	404-4 Cut-off tal darkness and s	Yes hut off the val	Yes we at the dispe	Clean/Dry enser.	1	1	Both	N	A Pass	NA	NA	NA	NA	NA
UDC	Beaudreau	404-4 Cut-off	Yes	Yes	Clean/Dry	2	5	Both	N	A Pass	NA	NA	NA	NA	NA
UDC Debris and dust a	Beaudreau accumulated over th	404-4 Cut-off e years.	Yes	Yes	Debris	NT	NT	NT	N	г ит	NA	NA	NA	NA	NA

Sensor	Panel	Panel	At Low	Wiring	Condition		Li	iquid Test	ting				F	lip Testinį	g	
Location	Make	Model	Point	OK	of Location	Resp	Rec	Alarm	PSD	Resi	ult	Resp	Rec	Alarm	PSD	Result
UDC	Beaudreau	404-4 Cut-off	Yes	Yes	Clean/Dry	15	1	Both	N	ΙA	Pass	NA	NA	NA	NA	NA
UDC	Beaudreau	404-4 Cut-off	Yes	Yes	Clean/Dry	1	1	Both	Y	res	Pass	NA	NA	NA	NA	NA
Sensor failed testi	ng 6 weeks earlier	. Technician repla	aced control m	odule (located	l under dispenser) and nov	sensor worked	•									
UDC	Beaudreau	404-4 Cut-off	Yes	Yes	Clean/Dry	1	1	Both	Y	es	Pass	NA	NA	NA	NA	NA
Sensor failed testi	ng 6 weeks earlier	. Technician repla	aced control m	odule (located	l under dispenser) and nov	sensor worked										
UDC	Beaudreau	404-4 Cut-off	Yes	Yes	Clean/Dry	1	1	Both	Y	es	Pass	NA	NA	NA	NA	NA
Sensor failed testi	ng 6 weeks earlier	. Technician repla	aced control m	odule (located	l under dispenser) and nov	sensor worked										
UDC	Beaudreau	404-4 Cut-off	Yes	Yes	Clean/Dry	1	1	Both	Y	es	Pass	NA	NA	NA	NA	NA
Sensor failed testi	ng 6 weeks earlier	. Technician repla	aced control m	odule (located	l under dispenser) and nov	sensor worked	•									
UDC	Beaudreau	404-4 Cut-off	Yes	Yes	Clean/Dry	1	1	Both	N	ΙA	Pass	NA	NA	NA	NA	NA
UDC	Beaudreau	404-4 Cut-off	Yes	Yes	Clean/Dry	1	1	Both	N	ΙA	Pass	NA	NA	NA	NA	NA
UDC	Beaudreau	404-4 Cut-off	Yes	Yes	Clean/Dry	1	1	Both	N	ΙA	Pass	NA	NA	NA	NA	NA
UDC	Beaudreau	404-4 Cut-off	Yes	Yes	Clean/Dry	1	1	Both	N	ΙA	Pass	NA	NA	NA	NA	NA
UDC	Beaudreau	404-4 Cut-off	Yes	Yes	Clean/Dry	1	1	Both	N	ΙA	Pass	NA	NA	NA	NA	NA
UDC	Beaudreau	404-4 Cut-off	Yes	Yes	Clean/Dry	1	1	Both	N	ΙA	Pass	NA	NA	NA	NA	NA
Sensor M	ake: Emc	)														
ensor Model	: Q0003-006			Operatio	ng Principle: Optical											
Tank Interstice	Emco	EECO 3000	Yes	Yes	Clean/Dry	60	60	Product	N	ΙA	Pass	NA	NA	NA	NA	NA
Tank Interstice	Emco	EECO 3000	Yes	Yes	Clean/Dry	60	60	Product	N	ΙA	Pass	NA	NA	NA	NA	NA
Tank Interstice	Emco	EECO 3000	Yes	Yes	Clean/Dry	60	60	Product	N	ΙA	Pass	NA	NA	NA	NA	NA
Tank Interstice	Emco	EECO 3000	Yes	Yes	Clean/Dry	60	60	Product	N	ΙA	Pass	NA	NA	NA	NA	NA
ensor Model	: Q0003-010			Operatio	ng Principle: Optical											
Pump Sump	Emco Wheaton	Leak Sensor II	Yes	Yes	Clean/Dry		NT	NT	N	VТ	NT	NA	NA	NA	NP	NA
~8 oz water in cup	; panel did not su	port ATG, only g	good for open/	close sensor re	esponse; pressure operating	g principle?										
	Emco Wheaton	Leak Sensor II	Yes	Yes	Clean/Dry	NT	NT	NT	N	VТ	NT	NA	NA	NA	NA	NA
Tank Interstice																

Sensor Make: Gilbarco

Sensor Model: PA02591144000 Operating Principle: Float Switch

Sensor	Panel	Panel	At Low	Wiring	Condition		Li	iquid Test	ting				F	lip Testing	g	
Location	Make	Model	Point	OK	of Location	Resp	Rec	Alarm	PSD	Resu	ult	Resp	Rec	Alarm	PSD	Result
Pump Sump Sensor is Gilbarco	Gilbarco equivalent of VF	EMC R model -208.	Yes	Yes	Clean/Dry	NT	NT	NT	N	ΙΤ	NT	5	5	Product	Yes	Pass
Pump Sump Sensor is Gilbarco	Gilbarco equivalent of VF	EMC R model -208.	Yes	Yes	Clean/Dry	NT	NT	NT	N	lТ	NT	5	5	Product	Yes	Pass
Pump Sump Sensor is Gilbarco	Gilbarco equivalent of VF	EMC R model -208.	Yes	Yes	Clean/Dry	NT	NT	NT	N	lТ	NT	5	5	Product	Yes	Pass
Tank Interstice Unable to remove	Gilbarco and observe wast	EMC te oil UST overfil	Yes l sesor. Technic	Yes cian was able t	Clean/Dry o to activate sensor withir	NT n the tank.	NT	NT	N	ΙΤ	NT	360	1	Both	NP	Pass
Tank Interstice	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	N	lТ	NT	720	1	Both	NP	Pass
Tank Interstice	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	N	lΤ	NT	1	1	Product	NP	Pass
Tank Interstice Mid-grade and Pre	Gilbarco mium share the s	EMC ame annular spac	Yes e; some conder	Yes nsation; sensor	Clean/Dry casing split.	NT	NT	NT	N	ΙΤ	NT	720	1	Both	NP	Pass
Tank Interstice	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	N	lΤ	NT	1	1	Both	NP	Pass
Tank Interstice	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	N	lТ	NT	1	1	Both	NP	Pass
Tank Interstice	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	N	lТ	NT	1	1	Both	NP	Pass
Tank Interstice	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	N	lТ	NT	1	1	Both	NP	Pass
Tank Interstice	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	N	lТ	NT	1	1	Both	NP	Pass
Tank Interstice	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	N	lТ	NT	1	1	Product	NP	Pass
Tank Interstice Sensors was replace	Gilbarco ed by contractor	EMC two days after the	Yes e inspection.	Yes	Clean/Dry	NT	NT	NT	N	ΝΤ	NT	None	NA	None	NP	Fail
Tank Interstice	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	N	lТ	NT	1	1	Product	NP	Pass
Tank Interstice This was a two-cor	Gilbarco npartment tank (	EMC midgrade and pre	Yes mium). The ca	Yes sing of the ser	Clean/Dry sor was split and took the	NT e form of a bell.	NT	NT	N	ΙΤ	NT	5	5	Product	NP	Pass
Tank Interstice	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	N	lТ	NT	5	5	Product	NP	Pass
Tank Interstice	Gilbarco	EMC	Yes	Yes	Clean/Dry	8	5	Product	N	ΙA	Pass	NT	NT	NT	NT	NT
Tank Interstice Soil in the access a	Gilbarco rea for this senso	EMC or was stained dar	Yes k with diesel fu	Yes nel from unkno	Clean/Dry own source. Possibly over	9 rfill or surface w	5 rater ingr	Product ress.	N	ΙA	Pass	NT	NT	NT	NT	NT
Tank Interstice Alarm was set duri	Veeder-Root ng the removal o	TLS-350 of the sensor from	Yes the tank interst	Yes ice. Sensor wa	Water as also covered with dirty		NT	NT	N	lТ	NT	Unk	Unk	Product	NP	Pass
Tank Interstice	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	N	ЛТ	NT	1	1	Product	NP	Pass

Sensor	Panel	Panel	At Low	Wiring	Condition		L	iquid Tes	ting				F	lip Testin <sub>i</sub>	g	
Location	Make	Model	Point	OK	of Location	Resp	Rec	Alarm	PSD	Res	ult	Resp	Rec	Alarm	PSD	Resul
Tank Interstice Sensor is Gilbarco	Gilbarco o equivalent of V	EMC R model -420.	Yes	Yes	Clean/Dry	NT	NT	NT	1	NT	NT	5	5	Product	NP	Pass
Tank Interstice Sensor is Gilbarco	Gilbarco o equivalent of V	EMC R model -420.	Yes	Yes	Clean/Dry	NT	NT	NT	1	NT	NT	5	5	Product	NP	Pass
Tank Interstice Sensor is Gilbarco	Gilbarco o equivalent of V	EMC R model -420.	Yes	Yes	Clean/Dry	NT	NT	NT	1	NT	NT	5	5	Product	NP	Pass
Sensor Model	: PA0259200	0000		Operati	ng Principle: Float Switch											
Pump Sump LLD failed the 3	Gilbarco gph leak test. Nee	EMC eds replacement.	Yes	Yes	Clean/Dry	NT	NT	NT	1	NT	NT	840	5	Both	NP	Pass
Pump Sump Sensors was repla	Gilbarco aced by contractor	EMC two days after the	Yes e inspection and	Yes d positive shut	Clean/Dry down was rewired.	NT	NT	NT	1	NT	NT	5	5	Product	No	Fail
Pump Sump Sensors was repla	Gilbarco aced by contractor	EMC two days after the	Yes e inspection and	Yes d positive shut	Clean/Dry down was rewired.	NT	NT	NT	1	NT	NT	5	5	Product	No	Fail
Pump Sump	Gilbarco	EMC	Yes	Yes	Product	NT	NT	NT	1	NT	NT	5	5	Product	Yes	Pass
Pump Sump	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	1	NT	NT	10	1	Both	Yes	Pass
Pump Sump	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	1	NT	NT	840	5	Both	NP	Pass
Pump Sump	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	1	NT	NT	840	5	Both	NP	Pass
Pump Sump	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	1	NT	NT	5	5	Product	Yes	Pass
Sensor Model	: PA0259200	0010		Operati	ng Principle: Float Switch											
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	1	NT	NT	5	5	Product	Yes	Pass
Pump Sump	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	1	NT	NT	5	5	Product	Yes	Pass
Pump Sump	Gilbarco	EMC	Yes	Yes	Product	NT	NT	NT	1	NT	NT	10	1	Both	Yes	Pass
Pump Sump	Gilbarco	EMC	Yes	Yes	Product	NT	NT	NT	1	NT	NT	10	1	Both	Yes	Pass
Pump Sump Relay was stuck,	Gilbarco so the PSD failed	EMC when tested. It p	Yes assed when re-t	Yes ested.	Product	NT	NT	NT	1	NT	NT	30	1	Both	No	Fail
Pump Sump	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	1	NT	NT	5	5	Product	Yes	Pass
Pump Sump	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	1	NT	NT	5	5	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	1	NT	NT	5	5	Product	Yes	Pass
Pump Sump	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	1	NT	NT	5	5	Product	Yes	Pass
All times era	recorded in see	onds and height	e in inches									۸	nand:	x VI Tabl	la 2 Pa	72 1 of

Sensor	Panel	Panel	At Low	Wiring	Condition			iquid Test	_				lip Testinį	-	
Location	Make	Model	Point	OK	of Location	Resp	Rec	Alarm	PSD Re	esult	Resp	Rec	Alarm	PSD	Resul
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	Yes	Pass
Pump Sump	Gilbarco	EMC	No	Yes	Water	5	5	Product	Yes	Pass	NT	NT	NT	NT	NT
3-4 inches of water	er on both sides of	sump (low spots	of tank top).												
Pump Sump	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	7	10	Product	Yes	Pass
Flip test used sinc	e cable was too sl	nort to remove from	n sump for wa	ter test.											
Pump Sump	Gilbarco	EMC	No	Yes	Water	8	8	Product	Yes	Pass	NT	NT	NT	NT	NT
2-3 inches of water	er on both sides of	sump (low spots	of tank top).												
Pump Sump	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	Yes	Pass
Pump Sump	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	Yes	Pass
Pump Sump	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	Yes	Pass
ensor Model	: PA02593000	000-2		Operati	ng Principle: Float Sw	itch									
Tank Interstice	Gilbarco	EMC	NA	Yes	Brine-Filled	5	5	Product	Yes	Pass	NT	NT	NT	NT	NT
Pump shut down	on high and low le	evel alarms.													
Tank Interstice	Gilbarco	EMC	NA	Yes	Brine-Filled	5	5	Product	Yes	Pass	NT	NT	NT	NT	NT
Pump shut down	on high and low lo	evel alarms.													
Sensor M	ake: Inco	n													
Sensor Model	: TS-ILS			Operati	ng Principle: Optical										
Tank Interstice	Incon	1000ER	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	NA	NA	NA	NA	NA
Sensor Model	: TSP-HIS			Operati	ng Principle: Float Sw	itch									
3011301 1.10401									) IT	NT	15	Unk	Product	NP	Pass
	Incon	TS-1000	Yes	Yes	Brine-Filled	NT	NT	NT	NT	111	10				
Tank Interstice					Brine-Filled vas tested for both high leve				NI	1,1	13				
Tank Interstice						el and low leve			NT	NT	10	Unk	Product	NP	Pass
Tank Interstice The sensor is Inco	on (double floats)  Incon	continuously mon	itors the inters	titial space.It v	vas tested for both high leve	el and low leve	el alarms	s.				Unk	Product	NP	Pass
Tank Interstice The sensor is Inco	on (double floats)  Incon	continuously mon	itors the inters	titial space.It v	vas tested for both high leve	el and low leve	el alarms	s.				Unk	Product	NP	Pass
Tank Interstice The sensor is Inco Tank Interstice  Gensor Model  Fill Sump	Incon Incon Incon	TS-1000	Yes No	Yes  Operation  Yes	Brine-Filled  Brinciple: Float Sw	NT itch	el alarms	NT	NT	NT	10				
Tank Interstice The sensor is Inco Tank Interstice  Gensor Model  Fill Sump	Incon Incon Incon	TS-1000	Yes No	Yes  Operation  Yes	Brine-Filled  Brine-Filled  Brine-Filled  Product	NT itch	el alarms	NT	NT	NT	10				
Tank Interstice The sensor is Inco Tank Interstice Sensor Model Fill Sump The sump was ful	Incon  TSP-ULS  Incon I of diesel approx	TS-1000  TS-1000  TS-1000  imately 9 1/2 inch	Yes  No es deep. The s	Yes Operation Yes ensor was set	Brine-Filled  Brine-Filled	NT itch  NT oid alarming.	NT NT	NT NT	NT NT	NT NT	10	15	Product	Yes	Pass

Sensor	Panel	Panel	At Low	Wiring	Condition	·		iquid Test	O		_		lip Testing	_	
Location	Make	Model	Point	OK	of Location	Resp	Rec	Alarm	PSD Re	sult	Resp	Rec	Alarm	PSD	Result
Pump Sump Small metal casing	Incon g with holes at b	Unk ottom of sensor for	Yes liquid to enter	Yes; console had	Clean/Dry printer and ATG capability.		NT	NT	NT	NT	2	2	Both	NP	Pass
Pump Sump	Incon	1000ER	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Pump Sump This facility does	Incon not have a positi	TS-1000 ve shut-down featu	Yes are.	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	Unk	Product	NP	Pass
Pump Sump	Incon	TS-1000	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	Unk	Product	NP	Pass
Pump Sump	Incon	TS-1000EFI	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	25	Unk	Both	Yes	Pass
Pump Sump	Incon	TS-1000	Yes	Yes	Water	NT	NT	NT	NT	NT	1	15	Product	Yes	Pass
Tank Interstice	Incon	1000ER	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Tank Interstice	Incon	TS-1000	NA	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	15	Product	Yes	Pass
Tank Interstice Small metal casing	Incon g with holes at be	Unk ottom of sensor for	Yes liquid to enter	Yes; console had	Clean/Dry printer and ATG capability.	NT	NT	NT	NT	NT	2	2	Both	NP	Pass
Tank Interstice Small metal casing	Incon g with holes at b	Unk ottom of sensor for	Yes liquid to enter	Yes; console had	Clean/Dry printer and ATG capability.		NT	NT	NT	NT	2	2	Both	NP	Pass
UDC There was a substa	Incon antial amount of	TS-1000 product in the UD	Yes C. There seem	Yes ed to be a leak	Product in the piping under the dis	NT penser. It was	NT in alarm	NT on arrival.	NT .	NT	1	15	Product	Yes	Pass
UDC	Incon	1000ER	No	No	Water	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Sensor was turned	off when techni	cian conducted the	test. Sensor a	ppears to have	e been turned due to water in	n the UDC. A	fter turni	ng the sens	sor on, it pas	sed.					
Sensor Mo	ake: MS	4													
Sensor Model:	Tankgard 4	82607		Operati	ng Principle: Thermal	Conductivity									
Pump Sump	MSA	Tankguard	Yes	Yes	Water	NT	NT	NT	NT	NT	NA	NA	NA	NA	NA
Pump Sump Sensor initially tur	MSA rned off. Appea	Tankguard rs to have been turn	No ned off due to p	No product in the	Water sump. Sensor worked wher		NT nsor not	NT at lowest p	NT oint - about	NT 8" above.		NA	NA	NA	NA
Pump Sump Had to leave site b	MSA pefore witnessing	Tankguard g removal or re-inst	Yes callation of sens	Yes sor.	Clean/Dry	NT	NT	NT	NT	NT	NA	NA	NA	NA	NA
Tank Interstice Sensor also is mor	MSA nitoring the prese	Tankguard ense of antifreeze, v	Unk which shared th	Unk ne tank with th	Water ne waste oil.	NT	NT	NT	NT	NT	NA	NA	NA	NA	NA
			Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	NA		NA	NA	NA

Sensor	Panel	Panel	At Low	Wiring	Condition		I	Liquid Tes	ting			F	lip Testing	g	
Location	Make	Model	Point	OK	of Location	Resp	Rec	Alarm	PSD R	esult	Resp	Rec	Alarm	PSD	Result
ensor Model	: FHRB 810			Operati	ng Principle: Float S	witch									
Tank Interstice	Veeder-Root	TLS-350	NA	Yes	Brine-Filled	NT	NT	NT	NT	NT	20	Unk	Both	NP	Pass
This single sensor	r monitors the regul	ar-mid-premium ta	nks; two res	servoirs are use	ed (left and right) and both	must be activa	ited for t	he alarm to	go off.						
Sensor M	ake: Perm	Alert													
Sensor Model	: PSTV			Operati	ng Principle: Float S	witch									
Tank Interstice	Red Jacket	PPM 4000	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	3	Unk	Both	Yes	Pass
Sensor M	ake: Pneu	meractor													
Sensor Model	: LS 600LD			Operati	ng Principle: Float S	witch									
Pump Sump	Pneumeractor	LC-1000	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	2	2	Product	Yes	Pass
Unknown sensor	type, photo taken.	Flip test was done	because sens	sor wiring prev	vented removal of the sens	sor ( wiring too	short).								
Pump Sump	Pneumeractor	LC-1000	Unk	Yes	Water	NT	NT	NT Disturs	NT	NT	2	Unk	Product	NP	Pass
	1 1 1	L		4 1											
Water in sumps w					ing too short. No labels o					NT	2	Link	Draduat	NID	Dogg
	vas below level of the Pneumeractor	he sensor. Flip test LC-1000	was done du Unk	ue to wiring be Yes	ing too short. No labels o	r markings on t	NT	NT	NT	NT	2	Unk	Product	NP	Pass
Water in sumps w		LC-1000								NT	2	Unk	Product	NP	Pass
Water in sumps w Pump Sump  Sensor M	Pneumeractor	LC-1000		Yes		NT				NT	2	Unk	Product	NP	Pass
Water in sumps w Pump Sump  Sensor M	Pneumeractor  ake: Red J	LC-1000		Yes	Water	NT				NT NT	2	Unk	Product	NP	
Water in sumps w Pump Sump  Sensor Model  Fill Sump	Pneumeractor  ake: Red J  : Liquid Refrac	LC-1000  Vacket etion Sensor  PPM 4000	Unk	Yes Operation	Water ng Principle: Optical	NT	NT	NT	NT						
Water in sumps we Pump Sump  Sensor Model  Fill Sump Sensor has been p	Pneumeractor  (ake: Red J  : Liquid Refract  Red Jacket	LC-1000  Facket  etion Sensor  PPM 4000 h water in the fill/v	Unk	Yes  Operation Yes	Water ng Principle: Optical	NT NT	NT	NT	NT						
Pump Sump  Sensor Model  Fill Sump  Sensor has been p	Pneumeractor  Ake: Red J  Liquid Refract  Red Jacket  pulled up due to hig	LC-1000  Facket  etion Sensor  PPM 4000 h water in the fill/v	Unk	Yes  Operation Yes	Water  ng Principle: Optical  Water/Debris	NT NT	NT	NT	NT						
Pump Sump  Sensor Model  Fill Sump  Sensor has been p  Sensor Model	Pneumeractor  Ake: Red J  Liquid Refract  Red Jacket  pulled up due to hig  RE400-111-5	LC-1000  Facket  etion Sensor  PPM 4000  h water in the fill/v	Unk No vapor sump.	Operation Yes Operation	Water  ng Principle: Optical  Water/Debris  ng Principle: Float Se	NT NT witch	NT NT	NT	NT	NT		Unk	Both	Yes	Pass
Pump Sump  Sensor Model  Fill Sump Sensor has been p Sensor Model  Pump Sump	Pneumeractor  Ake: Red J  Liquid Refract  Red Jacket  pulled up due to hig  RE400-111-5  Red Jacket	LC-1000  Facket  etion Sensor  PPM 4000 h water in the fill/v  STL 1801	No vapor sump.	Yes  Operation Yes  Operation Yes	Water  ng Principle: Optical  Water/Debris  ng Principle: Float So	NT NT witch	NT NT NT	NT NT	NT NT	NT NT	2	Unk	Both	Yes	Pass
Pump Sump  Sensor Model  Fill Sump Sensor has been p Sensor Model  Pump Sump  Pump Sump	Pneumeractor  [ake: Red J : Liquid Refract Red Jacket pulled up due to hig : RE400-111-5 Red Jacket Red Jacket	LC-1000  Facket  Etion Sensor  PPM 4000 h water in the fill/v  STL 1801  STL 1401	No vapor sump.  Yes Yes	Yes  Operation Yes  Operation Yes  Yes	Water  ng Principle: Optical  Water/Debris  ng Principle: Float So  Clean/Dry  Clean/Dry	NT NT Witch NT NT	NT NT NT	NT NT NT	NT NT NT	NT NT NT	1	Unk  1 1	Both Both Both	Yes NP NP	Pass Pass Pass
Pump Sump Sensor Model Fill Sump Sensor has been p Sensor Model Pump Sump Pump Sump Pump Sump	Pneumeractor  Ake: Red J  : Liquid Refract  Red Jacket  pulled up due to hig  : RE400-111-5  Red Jacket  Red Jacket  Red Jacket	LC-1000  Facket  Stion Sensor  PPM 4000 h water in the fill/v  STL 1801  STL 1401  STL 1401	No vapor sump.  Yes Yes Yes	Yes  Operation Yes  Operation Yes Yes Yes	Water  ng Principle: Optical  Water/Debris  ng Principle: Float Sv  Clean/Dry  Clean/Dry  Clean/Dry	NT NT witch NT NT NT	NT NT NT NT NT	NT NT NT NT	NT NT NT NT NT	NT NT NT NT	1 1 1	Unk  1 1 1	Both Both Both	Yes NP NP	Pass Pass Pass
Pump Sump Sensor Model Fill Sump Sensor has been p Sensor Model Pump Sump Pump Sump Pump Sump Pump Sump Pump Sump	Pneumeractor  Ake: Red J  : Liquid Refract  Red Jacket  pulled up due to hig  : RE400-111-5  Red Jacket  Red Jacket  Red Jacket  Red Jacket  Red Jacket	LC-1000  Facket  etion Sensor  PPM 4000 h water in the fill/v  STL 1801  STL 1401  STL 1401  STL 1801	No vapor sump.  Yes Yes Yes Yes	Yes  Operation Yes  Yes  Yes  Yes  Yes  Yes	Water  Ing Principle: Optical Water/Debris  Ing Principle: Float State Clean/Dry Clean/Dry Clean/Dry Clean/Dry Clean/Dry	NT NT witch NT NT NT NT NT	NT NT NT NT NT NT	NT NT NT NT NT NT	NT NT NT NT NT NT	NT NT NT NT NT	2 1 1 1	Unk  1 1 1 1	Both Both Both Both	Yes NP NP NP	Pass Pass Pass Pass
Pump Sump Sensor Model Fill Sump Sensor has been p Sensor Model Pump Sump	Pneumeractor  Take: Red J  : Liquid Refract Red Jacket pulled up due to hig : RE400-111-5  Red Jacket	LC-1000  Facket  Etion Sensor  PPM 4000 h water in the fill/v  STL 1801  STL 1401  STL 1801  STL 1401	No vapor sump.  Yes Yes Yes Yes Yes	Yes  Operation Yes  Yes  Yes  Yes  Yes  Yes  Yes  Yes	Water  Ing Principle: Optical  Water/Debris  Ing Principle: Float State  Clean/Dry  Clean/Dry  Clean/Dry  Clean/Dry  Clean/Dry  Clean/Dry  Clean/Dry	NT NT NT NT NT NT NT NT NT	NT NT NT NT NT NT NT NT	NT NT NT NT NT NT NT	NT NT NT NT NT NT NT	NT NT NT NT NT NT	2 1 1 1 1	Unk  1 1 1 1 1	Both Both Both Both Both Both	Yes  NP NP NP NP NP	Pass Pass Pass Pass Pass

Sensor	Panel	Panel	At Low	Wiring	Condition		1	Liquid Test	ting			I	lip Testin <sub>i</sub>	g	
Location	Make	Model	Point	OK	of Location	Resp	Rec	Alarm	PSD Re	esult	Resp	Rec	Alarm	PSD	Result
Sensor Mo	ake: Ron	an													
ensor Model:	LS-3			Operati	ng Principle: Float Swit	tch									
Fill Sump Float was stuck. T	Ronan echnician had to	X76S shake it to loosen it	Yes t, then sensor	Yes went into alar	Clean/Dry m.	NT	NT	NT	NT	NT	1	1	Both	NP	Fail
Fill Sump	Ronan	X761VCS-3LXi	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	2	2	Product	Yes	Pass
Fill Sump	Ronan	X761VCS-3LXi	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	2	2	Product	Yes	Pass
Fill Sump	Ronan	X76S	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Product	Yes	Pass
Fill Sump	Ronan	X76S	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Product	Yes	Pass
Fill Sump Slight amount of v	Ronan vater in fill sumj	X76S o. Not enough to act	Yes tivate an alarn	Yes n.	Water	NT	NT	NT	NT	NT	1	1	Product	Yes	Pass
Fill Sump	Ronan	X761VCS-3LXi	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	2	2	Product	Yes	Pass
Fill Sump	Ronan	X76S	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Both	NP	Pass
Fill Sump Sensor appears to	Red Jacket be good during	PPM 4000 a continuity test, but	No appears not t	Yes o be hooked u	Water/Debris p to the control panel.	NT	NT	NT	NT	NT	Unk	Unk	None	No	Fail
Monitoring Well Sensor is a custom	EBW version of the I	AutoStik Jr. 4 LS3-A. It is made of	Yes f stainless stee	Yes el and is resista	Backfill ant to the chemicals stored in	NT the system.	NT	NT	NT	NT	1	1	Product	NP	Pass
Monitoring Well Sensor is a custom	EBW version of the I	AutoStik Jr. 4 LS3-A. It is made of	Yes f stainless stee	Yes el and is resista	Backfill ant to the chemicals stored in	NT the system.	NT	NT	NT	NT	1	1	Product	NP	Pass
Monitoring Well Sensor is a custom	EBW version of the I	AutoStik Jr. 4 LS3-A. It is made of	Yes f stainless stee	Yes el and is resista	Backfill ant to the chemicals stored in	NT the system.	NT	NT	NT	NT	1	1	Product	NP	Pass
Monitoring Well Sensor is a custom	EBW version of the I	AutoStik Jr. 4 LS3-A. It is made of	Yes f stainless stee	Yes el and is resista	Backfill ant to the chemicals stored in	NT the system.	NT	NT	NT	NT	1	1	Product	NP	Pass
Monitoring Well Sensor is a custom	EBW version of the I	AutoStik Jr. 4 LS3-A. It is made of	Yes f stainless stee	Yes el and is resista	Backfill ant to the chemicals stored in	NT the system.	NT	NT	NT	NT	1	1	Product	NP	Pass
Monitoring Well Sensor is a custom	EBW version of the I	AutoStik Jr. 4 LS3-A. It is made of	Yes f stainless stee	Yes el and is resista	Backfill ant to the chemicals stored in	NT the system.	NT	NT	NT	NT	1	1	Product	NP	Pass
Ionitoring Well ensor is a custom	EBW version of the I	AutoStik Jr. 4 LS3-A. It is made of	Yes f stainless stee	Yes el and is resista	Backfill ant to the chemicals stored in	NT the system.	NT	NT	NT	NT	1	1	Product	NP	Pass
Monitoring Well Sensor is a custom	EBW version of the I	AutoStik Jr. 4 LS3-A. It is made of	Yes f stainless stee	Yes el and is resista	Backfill ant to the chemicals stored in	NT the system.	NT	NT	NT	NT	1	1	Product	NP	Pass

Sensor	Panel	Panel	At Low	Wiring	Condition		Li	quid Test	ing			F	lip Testing	g	
Location	Make	Model	Point	OK	of Location	Resp	Rec	Alarm	PSD	Result	Resp	Rec	Alarm	PSD	Result
Pump Sump	Ronan	X76-4X	Yes	Yes	Clean/Dry	NT	NT	NT	N	T NT	1	1	Both	NP	Pass
Pump Sump	Ronan	X76S	Yes	Yes	Water	NT	NT	NT	N	T N	2	2	Both	NP	Pass
Pump Sump Fail-safe was veri	Ronan fied operational.	X76S	Yes	Yes	Clean/Dry	NT	NT	NT	N	T NT	1	1	Product	Yes	Pass
Pump Sump	Ronan	X76VS	Yes	Yes	Clean/Dry	NT	NT	NT	N	T NT	2	1	Product	Yes	Pass
Pump Sump Fail-safe was veri	Ronan fied operational.	X76S	Yes	Yes	Clean/Dry	NT	NT	NT	N	T NT	1	1	Product	Yes	Pass
Pump Sump	Ronan	X76S	Yes	No	Clean/Dry	NT	NT	NT	N	T N1	3	NA	Product	Yes	Fail
Sensor would not	come out of alarr	n after testing. Pun	np would not	come on. Con	tractor repaired the facilit	ty. Problem was	wiring ii	nside the bu	uilding,	near the c	ontrol panel.				
Pump Sump	Ronan	X76S	Yes	Yes	Water	NT	NT	NT	N	T N	1	1	Both	Yes	Pass
Pump Sump	Ronan	X76S	Yes	Yes	Water	NT	NT	NT	N	T N	1	1	Both	Yes	Pass
Pump Sump Fail-safe was veri	Ronan fied operational.	X76S	Yes	Yes	Clean/Dry	NT	NT	NT	N	T NT	1	1	Product	Yes	Pass
Pump Sump Sensor appeared t	Red Jacket o be functional w	PPM 4000 then technician teste	Yes ed for continu	No ity, but did no	Water t activate an alarm at the p	NT panel. Tech sus	NT pects pro	NT blem with	N wiring b				None	No	Fail
Pump Sump This site has a suc	Ronan etion system and a	Unk a tank sump.	Yes	Yes	Clean/Dry	NT	NT	NT	N	T NT	2	2	Unk	NP	Pass
			Yes	Yes	Clean/Dry	NT	NT	NT	N	T NT	2	2	Product	Yes	Pass
Pump Sump	Ronan	X761VCS-3LXi	1 68		•	111									
Pump Sump	Red Jacket	PPM 4000	Yes	Yes nician replace	Clean/Dry d fill sump sensor and rep	NT	NT n wire in	NT the monito		T NT	3	Unk	Both	Yes	Pass
Pump Sump	Red Jacket	PPM 4000	Yes		Clean/Dry	NT			r.	T NT		Unk 1	Both	Yes	
Pump Sump After follow up w	Red Jacket rith local agency,	PPM 4000 inspector confirmed	Yes I that the tech	nician replace	Clean/Dry d fill sump sensor and rep	NT placed the broke	n wire in	the monito	or.		` 1				Pass
Pump Sump After follow up w	Red Jacket rith local agency, Ronan	PPM 4000 inspector confirmed X76LVC	Yes I that the tech	nician replace Yes	Clean/Dry d fill sump sensor and rep Clean/Dry	NT placed the broke	n wire in	the monito	or.	T NI	1	1	Product	Yes	Pass
Pump Sump After follow up w Pump Sump Pump Sump	Red Jacket rith local agency, Ronan Ronan	PPM 4000 inspector confirmed X76LVC X76LVC	Yes I that the tech Yes Yes	Yes Yes	Clean/Dry d fill sump sensor and rep Clean/Dry Clean/Dry	NT placed the brokes	n wire in NT NT	NT NT	r. N	T NT T NT	1 1 2	1	Product Product	Yes Yes	Pass Pass
Pump Sump After follow up w Pump Sump Pump Sump Pump Sump	Red Jacket rith local agency, Ronan Ronan	PPM 4000 inspector confirmed X76LVC X76LVC X76VS	Yes I that the tech Yes Yes Yes Yes	Yes Yes Yes Yes	Clean/Dry d fill sump sensor and rep Clean/Dry Clean/Dry Clean/Dry	NT blaced the broker	NT NT NT	NT NT NT	N N	T NT T NT	1 2 2	1 1 1	Product Product Product	Yes Yes Yes	Pass Pass Pass
Pump Sump After follow up w Pump Sump Pump Sump Pump Sump Pump Sump Pump Sump Pump Sump	Red Jacket eith local agency, Ronan Ronan Ronan Ronan Ronan Ronan Ronan	PPM 4000 inspector confirmed X76LVC X76LVC X76VS X76VS X76S X76S X76S	Yes I that the tech Yes Yes Yes Yes Yes Yes Yes Yes Yes	Yes Yes Yes Yes Yes Yes Yes Yes Yes	Clean/Dry d fill sump sensor and rep Clean/Dry Clean/Dry Clean/Dry Water	NT laced the broke NT NT NT NT NT NT NT NT	NT	NT	r. N N N N N	T N1	1 2 2	1 1 1 2	Product Product Product Both	Yes Yes Yes NP	Pass Pass Pass Pass Pass
Pump Sump After follow up w Pump Sump Pump Sump Pump Sump Pump Sump Pump Sump Pump Sump	Red Jacket eith local agency, Ronan Ronan Ronan Ronan Ronan Ronan Ronan	PPM 4000 inspector confirmed X76LVC X76LVC X76VS X76VS X76S X76S X76S	Yes I that the tech Yes Yes Yes Yes Yes Yes Yes Yes Yes	Yes Yes Yes Yes Yes Yes Yes Yes Yes	Clean/Dry d fill sump sensor and rep Clean/Dry Clean/Dry Clean/Dry Water Water Clean/Dry	NT laced the broke NT NT NT NT NT NT NT NT	NT	NT	N N N N N N N N N N N N N N N N N N N	T N1	1 1 2 2 1 2 2 2 2 2	1 1 1 2	Product Product Product Both Both	Yes Yes Yes NP NP	Pass Pass Pass Pass Pass
Pump Sump After follow up w Pump Sump	Red Jacket ith local agency, Ronan Ronan Ronan Ronan Ronan Ronan Ronan and Ronan Ronan Ronan and Ronan and and slightly	PPM 4000 inspector confirmed X76LVC X76LVC X76VS X76VS X76S X76S X76S upside-down, but no	Yes I that the tech Yes Yes Yes Yes Yes Yes Yes Yes Yes Ot in alarm. S	Yes	Clean/Dry d fill sump sensor and rep Clean/Dry Clean/Dry Clean/Dry Water Water Clean/Dry n when fully flipped over	NT N	NT N	NT NT NT NT NT NT Properly a	N N N N N N N N N N N N N N N N N N N	T NIT NIT NIT NIT NIT NIT NIT NIT NIT NI	1 1 2 2 1 2 2 2 5 5	1 1 2 2	Product Product Both Both Product	Yes Yes Yes NP NP NP Yes	Pass Pass Pass Pass Pass Pass

Sensor	Panel	Panel	At Low	Wiring	Condition		L	iquid Testi	ing				lip Testin <sub>ë</sub>	g	
Location	Make	Model	Point	OK	of Location	Resp	Rec	Alarm	PSD Re	sult	Resp	Rec	Alarm	PSD	Resul
Pump Sump	Ronan	X76S	Yes	Yes	Water	NT	NT	NT	NT	NT	2	2	Both	NP	Pass
Pump Sump	Ronan	X76LVC	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	NP	Pass
Pump Sump	Ronan	X761VCS-3LXi	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	2	2	Product	Yes	Pass
Pump Sump	Ronan	X76-4X	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Both	NP	Pass
Pump Sump	Ronan	X76-4X	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Both	NP	Pass
Tank Interstice	Ronan	X76S	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	2	2	Product	NP	Pass
Tank Interstice	Ronan	X76LVC	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Product	NP	Pass
Tank Interstice	Ronan	X76S	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Both	NP	Pass
Tank Interstice	Ronan	X76S	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Both	NP	Pass
Tank Interstice	Red Jacket	PPM 4000	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	3	Unk	Both	Yes	Pass
Tank Interstice	Ronan	X76S	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	2	2	Product	NP	Pass
Tank Interstice	Ronan	X76S	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Both	NP	Pass
UDC	Ronan	X76-4X	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Both	NP	Pass
UDC	Ronan	X76-4X	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Both	NP	Pass
UDC	Ronan	X76-4X	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Both	NP	Pass
UDC	Ronan	X76-4X	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Both	NP	Pass
UDC	Ronan	X76-4X	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	11	Both	NP	Pass
UDC	Ronan	X76-4X	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Both	NP	Pass
UDC	Ronan	X76-4X	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Both	NP	Pass
UDC	Ronan	X76-4X	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Both	NP	Pass
Sensor Model:	LS-30			Operati	ng Principle: Float S	witch									
Tank Interstice	Ronan	X76S	NA	Yes	Brine-Filled		NT	NT	NT	NT	2	2	Both	NP	Pass
Tank Interstice	Ronan	X76S	NA	Yes	Brine-Filled	NT	NT	NT	NT	NT	2	2	Both	NP	Pass
Tank Interstice Ronan- LS-30 hyd	Ronan rostatic in gene	Unk rator tank.	NA	Yes	Unk	3	3	Water	NA	Pass	NT	NT	NT	NT	NT
Tank Interstice	Ronan	X76S	NA	Yes	Brine-Filled	NT	NT	NT	NT	NT	2	2	Both	NP	Pass
Tank Interstice	Ronan	X76S	NA	Yes	Brine-Filled	NT	NT	NT	NT	NT	2	2	Both	NP	Pass

Sensor	Panel	Panel	At Low	Wiring	Condition		L	iquid Tesi	ting			I	lip Testin	g	
Location	Make	Model	Point	OK	of Location	Resp	Rec	Alarm	PSD	Result	Resp	Rec	Alarm	PSD	Result
Sensor Model:	LS-7			Operatii	ng Principle: Float Sw	itch									
Tank Interstice Technician pulled	Ronan wire and pull str	X76S ing at the same tim	Yes ne. This lifts th	Yes e sensor off th	Clean/Dry e bottom of the tank interst	NT	NT s the floa	NT at to fall, ac		IT NT the alarm.	1	1	Product	NP	Pass
Tank Interstice Technician pulled	Ronan wire and pull str	X76S ing at the same tim	Yes ne. This lifts th	Yes e sensor off th	Clean/Dry e bottom of the tank interst	NT	NT s the floa	NT at to fall, ac		T NT the alarm.	1	1	Product	NP	Pass
Tank Interstice Technician pulled	Ronan wire and pull str	X76S ing at the same tim	Yes ne. This lifts th	Yes e sensor off th	Clean/Dry e bottom of the tank interst	NT	NT s the floa	NT at to fall, ac		T NT the alarm.	1	1	Product	NP	Pass
Tank Interstice	Ronan	X76S	Yes	Yes	Clean/Dry	NT	NT	NT	N	IT NT	3	1	Product	NP	Pass
Tank Interstice	Ronan	X76S	Yes	Yes	Clean/Dry	NT	NT	NT	N	IT NT	3	1	Product	NP	Pass
Tank Interstice	Ronan	X76LVC	Yes	Yes	Clean/Dry	NT	NT	NT	N	IT NT	4	4	Product	NP	Pass
Tank Interstice	Ronan	X76-4X	Yes	Yes	Clean/Dry	NT	NT	NT	N	IT NT	1	1	Both	NP	Pass
Tank Interstice Alarm was activate	Ronan ed by shaking se	X76VS nsor while still in t	Yes ank interstice.	Yes	Clean/Dry	NT	NT	NT	N	IT NT	1	1	Product	NP	Pass
Tank Interstice The sensor could r	Ronan not be taken out o	X76LVC of the tank interstic	No e; therefore the	Yes e sensor was a	Clean/Dry ctivated within the tank.	NT	NT	NT	N	IT NT	5	5	Product	NP	Pass
Tank Interstice Sensor had to be re	Ronan e-installed with a	X76VS a fish-tape because	Yes the string was	Yes broken. This t	Clean/Dry	NT hour.	NT	NT	N	IT NT	1	1	Product	NP	Pass
Tank Interstice	Ronan	X76S	Yes	Yes	Clean/Dry	NT	NT	NT	N	IT NT	3	1	Product	NP	Pass
Tank Interstice	Ronan	X76LVC	Yes	Yes	Clean/Dry	NT	NT	NT	N	IT NT	5	5	Product	NP	Pass
Tank Interstice Alarm was activate	Ronan ed by shaking se	X76VS nsor while still in t	Yes ank interstice.	Yes	Clean/Dry	NT	NT	NT	N	IT NT	1	1	Product	NP	Pass
Tank Interstice	Ronan	X76LVC	Yes	Yes	Clean/Dry	NT	NT	NT	N	IT NT	3	3	Product	NP	Pass
Tank Interstice	Ronan	X76-4X	Yes	Yes	Clean/Dry	NT	NT	NT	N	IT NT	1	1	Both	NP	Pass
Tank Interstice	Ronan	X76-4X	Yes	Yes	Clean/Dry	NT	NT	NT	N	IT NT	1	1	Both	NP	Pass
Tank Interstice	Ronan	X76LVC	NA	Yes	Clean/Dry	NT	NT	NT	N	IT NT	5	5	Product	NP	Pass
Tank Interstice Alarm was activate	Ronan ed by shaking se	X76VS nsor while still in t	Yes ank interstice.	Yes	Clean/Dry	NT	NT	NT	N	IT NT	1	1	Product	NP	Pass
Sensor Model:	Unk			Operatii	ng Principle: Float Sw	itch									
	Veeder-Root	TLS-300	NA	Yes	Clean/Dry	NT	NT	NT		IT NT	2	2	Product	Yes	Pass

Panel	Panel	At Low	Wiring	Condition		1	Liquid Test	ing			F	lip Testing	g	
Make	Model	Point	OK	of Location	Resp	Rec	Alarm	PSD Re	sult	Resp	Rec	Alarm	PSD	Result
ike: Uni	versal													
LALS-1			Operati	ng Principle: Therma	al Conductivity									
Universal n audible alarm	Leak Alert LA-08 and shuts down pum	Yes p at the dispe	Yes	Clean/Dry	1	Unk	Both	Yes	Pass	NA	NA	NA	NA	NA
Universal n audible alarm	Leak Alert LA-08 and shuts down pum	Yes p at the dispe	Yes	Clean/Dry	1	Unk	Both	Yes	Pass	NA	NA	NA	NA	NA
Universal n audible alarm	Leak Alert LA-08 and shuts down pum	Yes p at the dispe	Yes	Clean/Dry	1	Unk	Both	Yes	Pass	NA	NA	NA	NA	NA
Universal	Leak Alert LA-08	Yes	Yes	Clean/Dry	2	Unk	Product	NA	Pass	NA	NA	NA	NA	NA
Universal	Leak Alert LA-08	Yes	Yes	Clean/Dry	3	2	Water	Yes	Pass	NA	NA	NA	NA	NA
Universal	Leak Alert LA-08	Yes	Yes	Clean/Dry	2	2	Water	Yes	Pass	NA	NA	NA	NA	NA
Universal on the sensor to	Leak Alert LA-08 activate the alarm. S	Yes Sensor respon	Yes ds instantly. S	Vapor Odor Sumps had been recently r	NT refinished and	NT had stro	NT ng chemical	NT smell, not fi	NT uel.	1	1	Product	NP	Pass
Universal	Leak Alert LA-08	Yes	Yes	Clean/Dry	2	Unk	Product	NA	Pass	NA	NA	NA	NP	NA
Universal on the sensor to	Leak Alert LA-08 activate the alarm. S	Yes Sensor respon	Yes ds instantly. S	Vapor Odor Sumps had been recently r	NT refinished and	NT had stro	NT ng chemical	NT smell, not fi	NT uel.	1	1	Product	NP	Pass
Universal	Leak Alert LA-08	Yes	Yes	Clean/Dry	2	Unk	Product	NA	Pass	NA	NA	NA	NA	NA
Universal	Leak Alert LA-08	Yes	Yes	Clean/Dry	8	10	Water	Yes	Pass	NA	NA	NA	NA	NA
Universal tor with 1000 g	Leak Alert LA-08 allon tank.	Yes	Yes	Clean/Dry	15	15	Water	NA	Pass	NA	NA	NA	NA	NA
Universal	Leak Alert LA-08	Yes	Yes	Clean/Dry	5	3	Water	Yes	Pass	NA	NA	NA	NA	NA
Universal	Leak Alert LA-08	Yes	Yes	Clean/Dry	4	4	Water	Yes	Pass	NA	NA	NA	NA	NA
Universal on the sensor to	Leak Alert LA-08 activate the alarm.	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	3	3	Water	NA	Pass
Universal on the sensor to	Leak Alert LA-08 activate the alarm. S	Yes Sensor respon	Yes ds instantly.	Clean/Dry	NT	NT	NT	NT	NT	1	1	Product	NA	Pass
Universal on the sensor to			Yes ds instantly.	Clean/Dry	NT	NT	NT	NT	NT	1	1	Product	NA	Pass
Universal on the sensor to			Yes ds instantly.	Clean/Dry	NT	NT	NT	NT	NT	1	1	Product	NA	Pass
	LALS-1  Universal n audible alarm Universal n audible alarm Universal	Make Model  Ake: Universal  LALS-1  Universal Leak Alert LA-08 n audible alarm and shuts down pum Universal Leak Alert LA-08 n audible alarm and shuts down pum Universal Leak Alert LA-08 n audible alarm and shuts down pum Universal Leak Alert LA-08	Make Model Point  Ike: Universal  LALS-1  Universal Leak Alert LA-08 Yes an audible alarm and shuts down pump at the dispersal audible alarm and shuts down pump at the dispersal Leak Alert LA-08 Yes an audible alarm and shuts down pump at the dispersal Leak Alert LA-08 Yes an audible alarm and shuts down pump at the dispersal Leak Alert LA-08 Yes  Universal Leak Alert LA-08 Yes  On the sensor to activate the alarm. Sensor responsion the sensor to activate the alarm.	Make Model Point OK  Take: Universal  Lak Alert LA-08 Yes Yes an audible alarm and shuts down pump at the dispenser.  Universal Leak Alert LA-08 Yes Yes an audible alarm and shuts down pump at the dispenser.  Universal Leak Alert LA-08 Yes Yes an audible alarm and shuts down pump at the dispenser.  Universal Leak Alert LA-08 Yes Yes Yes an audible alarm and shuts down pump at the dispenser.  Universal Leak Alert LA-08 Yes Yes Yes Universal Leak Alert LA-08 Yes Yes Yes Universal Leak Alert LA-08 Yes Yes On the sensor to activate the alarm. Sensor responds instantly. Such the sensor to activate the alarm. Sensor responds instantly. Such the sensor to activate the alarm. Sensor responds instantly. Such the sensor to activate the alarm. Sensor responds instantly. Such the sensor to activate the alarm. Sensor responds instantly. Such the sensor to activate the alarm. Sensor responds instantly. Such the sensor to activate the alarm. Sensor responds instantly. Such the sensor to activate the alarm. Sensor responds instantly. Such the sensor to activate the alarm.  Universal Leak Alert LA-08 Yes Yes Yes Universal Leak Alert LA-08 Yes Yes Yes Universal Leak Alert LA-08 Yes Yes On the sensor to activate the alarm. Sensor responds instantly. Universal Leak Alert LA-08 Yes Yes Yes On the sensor to activate the alarm. Sensor responds instantly.	Make Model Point OK of Location    Comparison of Location	Make Model Point OK of Location Responder.    Comparing Principle: Thermal Conductivity	Make Model Point OK of Location Resp Recombination Make: Universal  LALS-1 Operating Principle: Thermal Conductivity  Universal Leak Alert LA-08 Yes Yes Clean/Dry 1 Unk audible alarm and shuts down pump at the dispenser.  Universal Leak Alert LA-08 Yes Yes Clean/Dry 1 Unk audible alarm and shuts down pump at the dispenser.  Universal Leak Alert LA-08 Yes Yes Clean/Dry 1 Unk audible alarm and shuts down pump at the dispenser.  Universal Leak Alert LA-08 Yes Yes Clean/Dry 2 Unk Universal Leak Alert LA-08 Yes Yes Clean/Dry 3 2  Universal Leak Alert LA-08 Yes Yes Clean/Dry 3 2  Universal Leak Alert LA-08 Yes Yes Clean/Dry 2 2  Universal Leak Alert LA-08 Yes Yes Vapor Odor NT NT on the sensor to activate the alarm. Sensor responds instantly. Sumps had been recently refinished and had stroen the sensor to activate the alarm. Sensor responds instantly. Sumps had been recently refinished and had stroen the sensor to activate the alarm. Sensor responds instantly. Sumps had been recently refinished and had stroen the sensor to activate the alarm. Sensor responds instantly. Sumps had been recently refinished and had stroen the sensor to activate the alarm. Sensor responds instantly. Sumps had been recently refinished and had stroen the sensor to activate the alarm. Sensor responds instantly. Sumps had been recently refinished and had stroen the sensor to activate the alarm. Sensor responds instantly. Sumps had been recently refinished and had stroen the sensor to activate the alarm. Sensor responds instantly. Sumps had been recently refinished and had stroen the sensor to activate the alarm. Sensor responds instantly. Universal Leak Alert LA-08 Yes Yes Clean/Dry 2 Unix Universal Leak Alert LA-08 Yes Yes Clean/Dry 3 3  Universal Leak Alert LA-08 Yes Yes Clean/Dry 5 3  Universal Leak Alert LA-08 Yes Yes Clean/Dry NT NT on the sensor to activate the alarm. Sensor responds instantly. Universal Leak Alert LA-08 Yes Yes Clean/Dry NT NT on the sensor to activate the alarm. Sensor responds instantly. Universal Leak Alert LA-08 Ye	Make Model Point OK of Location Resp Rec Alarm    Alarm   Alare   Alarm   Alarm   Alarm	Make Model Point OK of Location Resp Rec Alarm PSD Rec Rec Universal  LALS-1  Operating Principle: Thermal Conductivity  Universal Leak Alert LA-08 Yes Yes Clean/Dry 1 Unk Both Yes a undible alarm and shuts down pump at the dispenser.  Universal Leak Alert LA-08 Yes Yes Clean/Dry 1 Unk Both Yes a undible alarm and shuts down pump at the dispenser.  Universal Leak Alert LA-08 Yes Yes Clean/Dry 1 Unk Both Yes a undible alarm and shuts down pump at the dispenser.  Universal Leak Alert LA-08 Yes Yes Clean/Dry 1 Unk Both Yes a undible alarm and shuts down pump at the dispenser.  Universal Leak Alert LA-08 Yes Yes Clean/Dry 2 Unk Product NA Universal Leak Alert LA-08 Yes Yes Clean/Dry 3 2 Water Yes Universal Leak Alert LA-08 Yes Yes Clean/Dry 2 2 Water Yes Universal Leak Alert LA-08 Yes Yes Vapor Odor NT NT NT NT NT mto the sensor to activate the alarm. Sensor responds instantly. Sumps had been recently refinished and had strong chemical smell, not fit Universal Leak Alert LA-08 Yes Yes Vapor Odor NT NT NT NT NT NT on the sensor to activate the alarm. Sensor responds instantly. Sumps had been recently refinished and had strong chemical smell, not fit Universal Leak Alert LA-08 Yes Yes Vapor Odor NT NT NT NT NT ON the sensor to activate the alarm. Sensor responds instantly. Sumps had been recently refinished and had strong chemical smell, not fit Universal Leak Alert LA-08 Yes Yes Clean/Dry 2 Unk Product NA Universal Leak Alert LA-08 Yes Yes Clean/Dry 8 10 Water Yes Universal Leak Alert LA-08 Yes Yes Clean/Dry 8 10 Water Yes Universal Leak Alert LA-08 Yes Yes Clean/Dry 15 15 Water NA Universal Leak Alert LA-08 Yes Yes Clean/Dry NT NT NT NT NT NT NT On the sensor to activate the alarm.  Universal Leak Alert LA-08 Yes Yes Clean/Dry NT NT NT NT NT NT NT on the sensor to activate the alarm. Sensor responds instantly.  Universal Leak Alert LA-08 Yes Yes Clean/Dry NT NT NT NT NT NT NT On the sensor to activate the alarm. Sensor responds instantly.	Make Model Point OK of Location Resp Rec Alarm PSD Result    Italian	Make   Model   Point   OK   of Location   Resp   Rec   Alarm   PSD   Result   Resp	Make   Model   Point   OK   of Location   Resp   Rec   Alarm   PSD   Result   Resp   Rec	Make	Make   Model   Point   OK   of Location   Resp   Rec   Alarm   PSD   Result   Resp   Rec   Alarm   PSD

Panel	Panel	At Low	Wiring	Condition		Li	quid Testin	$\overline{g}$			F	lip Testin	g	
Make	Model	Point	OK	of Location	Resp	Rec	Alarm P	SD Re	sult	Resp	Rec	Alarm	PSD	Result
Universal	Leak Alert LA-08	Yes	Yes	Clean/Dry	2	Unk	Product	NA	Pass	NA	NA	NA	NA	NA
Universal	Leak Alert LA-08	Yes	Yes	Clean/Dry	2	Unk	Product	NA	Pass	NA	NA	NA	NA	NA
Universal on the sensor to	Leak Alert LA-08 activate the alarm.	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	2	2	Both	NA	Pass
Universal on the sensor to	Leak Alert LA-08 activate the alarm.	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	3	3	Water	NA	Pass
Universal	Leak Alert LA-08	Yes	Yes	Clean/Dry	3	3	None	Yes	Pass	NA	NA	NA	NA	NA
Universal on the sensor to	Leak Alert LA-08 activate the alarm.	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	3	3	Water	NA	Pass
Universal audible alarm	Leak Alert LA-08 and shuts down pump	Yes at the disper	Yes nser.	Clean/Dry	1	Unk	Both	Yes	Pass	NA	NA	NA	NA	NA
Universal audible alarm	Leak Alert LA-08 and shuts down pump	Yes at the disper	Yes nser.	Clean/Dry	1	Unk	Both	Yes	Pass	NA	NA	NA	NA	NA
Universal for 2 minutes fo	Leak Alert LA-08 or the sensor to respon	Yes nse, but never	Yes did. Sensor h	Clean/Dry and to be replaced.	NT	NT	NT	NT	NT	None	None	None	NA	Fail
Universal ted because it w	Leak Alert LA-08 as stuck in the interst	Yes titial space.	Yes	Clean/Dry	None	NA	None	No	Fail	NA	NA	NA	NA	NA
Universal	Leak Alert LA-08	Yes	Yes	Clean/Dry	2	Unk	Product	NA	Pass	NA	NA	NA	NA	NA
LAVS-1			Operati	ng Principle: Metal O	xide Semicond	uctor								
Universal	Leak Alert LA-08	Yes	Yes	Clean/Dry	Unk	Unk	Unk	No	Fail	NA	NA	NA	NA	NA
LS 03875 S	TP Sensor		Operati	ng Principle: Thermal	Conductivity									
Universal bulb on the mo	Leak Alert LA-08 nitoring panel, but al	Yes arm activated	Yes I.	Clean/Dry	2	33	Product	Yes	Pass	NA	NA	NA	NP	NA
Universal bulb on the mo	Leak Alert LA-08 nitoring panel, but al	Yes arm activated	Yes I.	Clean/Dry	2	11	Product	Yes	Pass	NA	NA	NA	NA	NA
Universal bulb on the mo	Leak Alert LA-08 nitoring panel, but al	Yes arm activated	Yes l.	Clean/Dry	2	15	Product	Yes	Pass	NA	NA	NA	NP	NA
ike: Veed	der-Root										_			
330212-001			Operati	ng Principle: Float Sw	vitch									
			-									_		
	Make Universal Universal Universal Universal on the sensor to Universal ted because it w Universal	Universal Leak Alert LA-08 On the sensor to activate the alarm. Universal Leak Alert LA-08 Universal Leak Alert LA-08 Universal Leak Alert LA-08 On the sensor to activate the alarm. Universal Leak Alert LA-08 On the sensor to activate the alarm. Universal Leak Alert LA-08 On the sensor to activate the alarm. Universal Leak Alert LA-08 On audible alarm and shuts down pumpled universal Leak Alert LA-08 On the sensor to responsion to the sensor to activate the alarm.  Universal Leak Alert LA-08  Lake A	Make Model Universal Leak Alert LA-08 Yes Universal Leak Alert LA-08 Yes Universal Leak Alert LA-08 Yes On the sensor to activate the alarm. Universal Leak Alert LA-08 Yes On the sensor to activate the alarm. Universal Leak Alert LA-08 Yes On the sensor to activate the alarm. Universal Leak Alert LA-08 Yes On the sensor to activate the alarm. Universal Leak Alert LA-08 Yes On the sensor to activate the alarm. Universal Leak Alert LA-08 Yes On the sensor to activate the alarm. Universal Leak Alert LA-08 Yes On the sensor to activate the alarm. Universal Leak Alert LA-08 Yes On the sensor to activate the alarm. Universal Leak Alert LA-08 Yes On the sensor to activate the alarm. Universal Leak Alert LA-08 Yes On the dispersion of the sensor to response, but never the sensor to response the dispersion the sensor to activate the sensor the sensor the sensor the sensor the sensor t	Make Model Point OK  Universal Leak Alert LA-08 Yes Yes  on the sensor to activate the alarm.  Universal Leak Alert LA-08 Yes Yes  on the sensor to activate the alarm.  Universal Leak Alert LA-08 Yes Yes  Universal Leak Alert LA-08 Yes Yes  on the sensor to activate the alarm.  Universal Leak Alert LA-08 Yes Yes  on the sensor to activate the alarm.  Universal Leak Alert LA-08 Yes Yes  n audible alarm and shuts down pump at the dispenser.  Universal Leak Alert LA-08 Yes Yes  on audible alarm and shuts down pump at the dispenser.  Universal Leak Alert LA-08 Yes Yes  for 2 minutes for the sensor to response, but never did. Sensor Fermion of the sensor to response, but never did. Sensor Fermion of the sensor to response, but never did. Sensor Fermion of the sensor to response of the sensor to response of the sensor for the sensor for response of the sensor for response of the sensor for response of the sensor for the sensor for response of the sensor for res	Make Model Point OK of Location  Universal Leak Alert LA-08 Yes Yes Clean/Dry  Universal Leak Alert LA-08 Yes Yes Clean/Dry  Universal Leak Alert LA-08 Yes Yes Clean/Dry  on the sensor to activate the alarm.  Universal Leak Alert LA-08 Yes Yes Clean/Dry  on the sensor to activate the alarm.  Universal Leak Alert LA-08 Yes Yes Clean/Dry  Universal Leak Alert LA-08 Yes Yes Clean/Dry  Universal Leak Alert LA-08 Yes Yes Clean/Dry  on the sensor to activate the alarm.  Universal Leak Alert LA-08 Yes Yes Clean/Dry  on the sensor to activate the alarm.  Universal Leak Alert LA-08 Yes Yes Clean/Dry  on audible alarm and shuts down pump at the dispenser.  Universal Leak Alert LA-08 Yes Yes Clean/Dry  for 2 minutes for the sensor to response, but never did. Sensor had to be replaced.  Universal Leak Alert LA-08 Yes Yes Clean/Dry  ted because it was stuck in the interstitial space.  Universal Leak Alert LA-08 Yes Yes Clean/Dry  LAVS-1 Operating Principle: Metal O  Universal Leak Alert LA-08 Yes Yes Clean/Dry  LS 03875 STP Sensor Operating Principle: Thermal  Universal Leak Alert LA-08 Yes Yes Clean/Dry  bulb on the monitoring panel, but alarm activated.  Universal Leak Alert LA-08 Yes Yes Clean/Dry  bulb on the monitoring panel, but alarm activated.  Universal Leak Alert LA-08 Yes Yes Clean/Dry  bulb on the monitoring panel, but alarm activated.	Make Model Point OK of Location Resp Universal Leak Alert LA-08 Yes Yes Clean/Dry 2 Universal Leak Alert LA-08 Yes Yes Clean/Dry 2 Universal Leak Alert LA-08 Yes Yes Clean/Dry 7 In the sensor to activate the alarm.  Universal Leak Alert LA-08 Yes Yes Clean/Dry NT on the sensor to activate the alarm.  Universal Leak Alert LA-08 Yes Yes Clean/Dry NT on the sensor to activate the alarm.  Universal Leak Alert LA-08 Yes Yes Clean/Dry 3 Universal Leak Alert LA-08 Yes Yes Clean/Dry NT on the sensor to activate the alarm.  Universal Leak Alert LA-08 Yes Yes Clean/Dry 1 In audible alarm and shuts down pump at the dispenser.  Universal Leak Alert LA-08 Yes Yes Clean/Dry NT of or 2 minutes for the sensor to response, but never did. Sensor had to be replaced.  Universal Leak Alert LA-08 Yes Yes Clean/Dry None ted because it was stuck in the interstitial space.  Universal Leak Alert LA-08 Yes Yes Clean/Dry 2 LAVS-1 Operating Principle: Metal Oxide Semicond Universal Leak Alert LA-08 Yes Yes Clean/Dry 2 LAVS-1 Operating Principle: Thermal Conductivity  Universal Leak Alert LA-08 Yes Yes Clean/Dry 2 LAVS-1 Sonsor Operating Principle: Thermal Conductivity  Universal Leak Alert LA-08 Yes Yes Clean/Dry 2 LONGER OPERATING PRINCIPLE CONDUCTIVE OPERATION OPER	Make Model Point OK of Location Resp Rec  Universal Leak Alert LA-08 Yes Yes Clean/Dry 2 Unk  Universal Leak Alert LA-08 Yes Yes Clean/Dry 2 Unk  Universal Leak Alert LA-08 Yes Yes Clean/Dry NT NT on the sensor to activate the alarm.  Universal Leak Alert LA-08 Yes Yes Clean/Dry NT NT on the sensor to activate the alarm.  Universal Leak Alert LA-08 Yes Yes Clean/Dry NT NT on the sensor to activate the alarm.  Universal Leak Alert LA-08 Yes Yes Clean/Dry NT NT on the sensor to activate the alarm.  Universal Leak Alert LA-08 Yes Yes Clean/Dry NT NT on the sensor to activate the alarm.  Universal Leak Alert LA-08 Yes Yes Clean/Dry NT NT on the sensor to activate the alarm.  Universal Leak Alert LA-08 Yes Yes Clean/Dry NT NT on the sensor to activate the alarm.  Universal Leak Alert LA-08 Yes Yes Clean/Dry NT NT on the sensor to activate the alarm.  Universal Leak Alert LA-08 Yes Yes Clean/Dry NT NT on the sensor to activate the alarm.  Universal Leak Alert LA-08 Yes Yes Clean/Dry NT NT on the sensor to response, but never did. Sensor had to be replaced.  Universal Leak Alert LA-08 Yes Yes Clean/Dry None NA ted because it was stuck in the interstitial space.  Universal Leak Alert LA-08 Yes Yes Clean/Dry None NA ted because it was stuck in the interstitial space.  Universal Leak Alert LA-08 Yes Yes Clean/Dry 2 Unk  LAVS-1 Operating Principle: Metal Oxide Semiconductor  Universal Leak Alert LA-08 Yes Yes Clean/Dry 2 33  Lak Alert LA-08 Yes Yes Clean/Dry 2 33  Lak Alert LA-08 Yes Yes Clean/Dry 2 33  Luiversal Leak Alert LA-08 Yes Yes Clean/Dry 2 11  Universal Leak Alert LA-08 Yes Yes Clean/Dry 2 15  Universal Leak Alert LA-08 Yes Yes Clean/Dry 2 15  Universal Leak Alert LA-08 Yes Yes Clean/Dry 2 15  Universal Leak Alert LA-08 Yes Yes Clean/Dry 2 15  Universal Leak Alert LA-08 Yes Yes Clean/Dry 2 15  Universal Leak Alert LA-08 Yes Yes Clean/Dry 2 15  Universal Leak Alert LA-08 Yes Yes Clean/Dry 2 15	Make Model Point OK of Location Resp Rec Alarm Pulniversal Leak Alert LA-08 Yes Yes Clean/Dry 2 Unk Product Universal Leak Alert LA-08 Yes Yes Clean/Dry 2 Unk Product Universal Leak Alert LA-08 Yes Yes Clean/Dry NT NT NT NT on the sensor to activate the alarm.  Universal Leak Alert LA-08 Yes Yes Clean/Dry NT NT NT NT on the sensor to activate the alarm.  Universal Leak Alert LA-08 Yes Yes Clean/Dry NT NT NT NT on the sensor to activate the alarm.  Universal Leak Alert LA-08 Yes Yes Clean/Dry NT NT NT NT NT on the sensor to activate the alarm.  Universal Leak Alert LA-08 Yes Yes Clean/Dry NT NT NT NT on the sensor to activate the alarm.  Universal Leak Alert LA-08 Yes Yes Clean/Dry NT NT NT NT on the sensor to activate the alarm.  Universal Leak Alert LA-08 Yes Yes Clean/Dry NT NT NT NT on the sensor to activate the alarm.  Universal Leak Alert LA-08 Yes Yes Clean/Dry NT NT NT NT On the sensor to activate the alarm.  Universal Leak Alert LA-08 Yes Yes Clean/Dry NT NT NT NT NT On the sensor to response, but never did. Sensor had to be replaced.  Universal Leak Alert LA-08 Yes Yes Clean/Dry NN	Make Model Point OK of Location Resp Rec Alarm PSD Rec Universal Leak Alert LA-08 Yes Yes Clean/Dry 2 Unik Product NA Universal Leak Alert LA-08 Yes Yes Clean/Dry 2 Unik Product NA Universal Leak Alert LA-08 Yes Yes Clean/Dry NT	Make Model Point OK of Location Resp Rec Alarm PSD Result  Universal Leak Alert LA-08 Yes Yes Clean/Dry 2 Unk Product NA Pass  Universal Leak Alert LA-08 Yes Yes Clean/Dry 2 Unk Product NA Pass  Universal Leak Alert LA-08 Yes Yes Clean/Dry NT NT NT NT NT NT NT NT on the sensor to activate the alarm.  Universal Leak Alert LA-08 Yes Yes Clean/Dry NT	Make         Model         Point         OK         of Location         Resp         Rec         Alarm         PSD         Result         Resp           Universal         Leak Alert LA-08         Yes         Yes         Clean/Dry         2         Unk         Product         NA         Pass         NA           Universal         Leak Alert LA-08         Yes         Yes         Clean/Dry         NT         NT	Make         Model         Point         OK         of Location         Resp         Rec         Alarm         PSD         Result         Resp         Rec           Universal         Leak Alert LA-08         Yes         Yes         Clean/Dry         2         Unik         Product         NA         Pass         NA         NA           Universal         Leak Alert LA-08         Yes         Yes         Clean/Dry         NT         NT <td>Make         Model         Point         OK         of Location         Resp         Rec         Alarm         PSD         Result         Resp         Rec         Alarm           Universal         Leak Alert LA-08         Yes         Yes         Clean/Dry         2         Univ.         Product         NA         Pass         NA         NA</td> <td>  Make   Model   Point   OK   of Location   Resp   Rec   Alarm   PSD   Result   Resp   Rec   Alarm   PSD    </td>	Make         Model         Point         OK         of Location         Resp         Rec         Alarm         PSD         Result         Resp         Rec         Alarm           Universal         Leak Alert LA-08         Yes         Yes         Clean/Dry         2         Univ.         Product         NA         Pass         NA         NA	Make   Model   Point   OK   of Location   Resp   Rec   Alarm   PSD   Result   Resp   Rec   Alarm   PSD

Sensor	Panel	Panel	At Low	Wiring	Condition		Li	iquid Tes	ting			F	lip Testin	g	
Location	Make	Model	Point	OK	of Location	Resp	Rec	Alarm	PSD	Result	Resp	Rec	Alarm	PSD	Result
UDC	Veeder-Root	Dispenser cut-off	Yes	Yes	Clean/Dry	NT	NT	NT	N	Γ NT	1	MR	Both	NP	Pass
Sensor cuts powe	er to dispenser, wh	nich must be manuall	ly reset.												
UDC	Veeder-Root	Dispenser cut-off	Yes	Yes	Clean/Dry	NT	NT	NT	N	ΓNT	2	1	Product	Yes	Pass
UDC	Veeder-Root	Dispenser cut-off	Yes	Yes	Clean/Dry	NT	NT	NT	N	ΓNT	2	2	Product	Yes	Pass
UDC	Veeder-Root	Dispenser cut-off	Yes	Yes	Clean/Dry	NT	NT	NT	N	Γ ΝΤ	2	2	Product	Yes	Pass
UDC Sensor cuts power	Veeder-Root er to dispenser, wh	Dispenser cut-off nich must be manual	Yes ly reset.	Yes	Clean/Dry	NT	NT	NT	N	Γ ΝΤ	1	MR	Both	NP	Pass
UDC Sensor cuts powe	Veeder-Root er to dispenser, wh	Dispenser cut-off nich must be manuall	Yes ly reset.	Yes	Clean/Dry	NT	NT	NT	N	Г МТ	10	MR	Both	NP	Pass
Sensor Model	l: 331102-002			Operati	ng Principle: Float Swi	itch									
Pump Sump Sensor has doubl	Veeder-Root e float alarm (high	TLS-350 n/low). Service techr	Yes nician decide	Yes d only to do th	Clean/Dry e flip test.	NT	NT	NT	N	Г МТ	8	1	Both	Yes	Pass
Pump Sump Sensor has doubl	Veeder-Root e float alarm (high	TLS-350 n/low). Service techr	Yes nician decide	Yes d only to do th	Clean/Dry e flip test.	NT	NT	NT	N	Г МТ	5	1	Both	Yes	Pass
ensor Model	l: 794380-208			Operati	ng Principle: Float Swi	itch									
ATG Sump	Veeder-Root	TLS-350	Yes	Yes	Water	NT	NT	NT	N	Г NТ	Unk	Unk	Product	NP	Pass
Sump contains di	irty water. Alarm	was set at the control	l panel.												
ATG Sump	Veeder-Root	TLS-350 was set at the control	Yes	Yes	Water	NT	NT	NT	N	Г МТ	Unk	Unk	Product	NP	Pass
ATG Sump Sump contains di	Veeder-Root irty water. Alarm Veeder-Root	TLS-350	Yes l panel. Yes	Yes	Water	NT NT	NT NT	NT NT	N N		Unk		Product Product	NP NP	Pass Pass
ATG Sump Sump contains di	Veeder-Root irty water. Alarm Veeder-Root	TLS-350 was set at the control	Yes l panel. Yes							ΓNT					
ATG Sump Sump contains di ATG Sump Sump contains di	Veeder-Root irty water. Alarm Veeder-Root irty water. Alarm	TLS-350 was set at the control TLS-350 was set at the control	Yes I panel. Yes I panel	Yes	Water	NT	NT	NT	N	Г NT Г NT	Unk	Unk	Product	NP	Pass
ATG Sump Sump contains di ATG Sump Sump contains di ATG Sump	Veeder-Root irty water. Alarm Veeder-Root irty water. Alarm Veeder-Root	TLS-350 was set at the control TLS-350 was set at the control TLS-350	Yes I panel. Yes I panel Yes	Yes Yes	Water Clean/Dry	NT NT	NT NT	NT NT	N	T NT T NT T NT	Unk 5	Unk	Product Product	NP Yes	Pass Pass
ATG Sump Sump contains di ATG Sump Sump contains di ATG Sump ATG Sump ATG Sump Fill Sump	Veeder-Root irty water. Alarm Veeder-Root irty water. Alarm Veeder-Root Veeder-Root	TLS-350 was set at the control TLS-350 was set at the control TLS-350 TLS-350 TLS-350 TLS-350	Yes I panel. Yes I panel Yes Yes	Yes Yes Yes	Water  Clean/Dry  Clean/Dry	NT NT NT	NT NT NT	NT NT NT	N N	T NT T NT T NT T NT	Unk 5 5	Unk  1 1	Product Product	NP Yes	Pass Pass
ATG Sump Sump contains di ATG Sump Sump contains di ATG Sump ATG Sump ATG Sump ATG Sump	Veeder-Root irty water. Alarm Veeder-Root irty water. Alarm Veeder-Root Veeder-Root Veeder-Root Veeder-Root	TLS-350 was set at the control TLS-350 was set at the control TLS-350 TLS-350 TLS-350 TLS-350	Yes I panel. Yes I panel Yes Yes Yes	Yes Yes Yes Yes	Water  Clean/Dry  Clean/Dry  Clean/Dry	NT NT NT NT NT	NT NT NT NT	NT NT NT NT	N N N	T NT  T NT  T NT  T NT  T NT	Unk 5 5 5 5	Unk  1 1 1	Product Product Product	NP Yes Yes Yes	Pass Pass Pass
ATG Sump Sump contains di ATG Sump Sump contains di ATG Sump ATG Sump ATG Sump Fill Sump Fill Sump Fill Sump Fill Sump	Veeder-Root Irty water. Alarm Veeder-Root Iveeder-Root Veeder-Root	TLS-350 was set at the control TLS-350 was set at the control TLS-350 TLS-350 TLS-350 COTTOSION. TLS-350 TLS-350 TLS-350	Yes I panel. Yes I panel Yes Yes Yes Yes Yes Yes Yes	Yes Yes Yes Yes Yes Yes Yes	Water  Clean/Dry  Clean/Dry  Clean/Dry  Water	NT NT NT NT NT NT NT	NT NT NT NT NT	NT NT NT NT NT	N N N	T NT  T NT  T NT  T NT  T NT  T NT	Unk 5 5 5 3	Unk  1 1 1 3	Product Product Product Product	NP Yes Yes Yes Yes	Pass Pass Pass Pass Pass

Sensor	Panel	Panel	At Low	Wiring	Condition		L	iquid Test	ing			F	lip Testin	g	
Location	Make	Model	Point	OK	of Location	Resp	Rec	Alarm	PSD	Result	Resp	Rec	Alarm	PSD	Result
Fill Sump	Veeder-Root	TLS-350	No	Yes	Product	NT	NT	NT	N	T NT	2	2	Product	NP	Pass
Fill Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	T NT	2	2	Product	Yes	Pass
Fill Sump	Veeder-Root	TLS-350	Yes	Yes	Water	NT	NT	NT	N	T NT	10	2	Product	Yes	Pass
Fill Sump	Veeder-Root	TLS-350	Yes	Yes	Debris	NT	NT	NT	N	T NT	2	2	Product	NP	Pass
Fill Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	5	Unk	Product	N	A Pass	NT	NT	NT	NT	NT
Fill Sump Fill sump contai	Veeder-Root ns waste oil.	TLS-350	Yes	Yes	Product	NT	NT	NT	N	T NT	8	Unk	Product	NP	Pass
Fill Sump	Veeder-Root	TLS-350	Yes	Yes	Product	NT	NT	NT	N	T NT	8	Unk	Product	NP	Pass
Fill Sump	Veeder-Root	TLS-350	Yes	Yes	Product	NT	NT	NT	N	T NT	8	Unk	Product	NP	Pass
Fill Sump	Veeder-Root	TLS-350	Yes	Yes	Product	NT	NT	NT	N	T NT	8	Unk	Product	NP	Pass
Fill Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	10	5	Product	Y	es Pass	NT	NT	NT	NT	NT
Fill Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	5	5	Product	Y	es Pass	NT	NT	NT	NT	NT
Fill Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	8	5	Product	Y	es Pass	NT	NT	NT	NT	NT
Fill Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	5	5	Product	Y	es Pass	NT	NT	NT	NT	NT
Fill Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	5	5	Product	Y	es Pass	NT	NT	NT	NT	NT
Fill Sump	Veeder-Root	TLS-350	No	Yes	Clean/Dry	NT	NT	NT	N	T NT	1	1	Both	NP	Pass
Fill Sump	Veeder-Root	TLS-350	No	Yes	Clean/Dry	NT	NT	NT	N	T NT	1	1	Both	NP	Pass
Fill Sump Technician waite	Veeder-Root ed for over 2 minut	TLS-350 res, but sensor did	Yes not alarm. Fina	Yes ally inspector of	Water decided to call the test off	NT and replace the	NT sensor.	NT Testing wa	N s done o		none ensor and it p		None	No	Fail
Fill Sump	Veeder-Root	TLS-350	No	Yes	Clean/Dry	NT	NT	NT	N	T NT	1	1	Both	NP	Pass
Fill Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	T NT	5	1	Product	Yes	Pass
Fill Sump	Veeder-Root	TLS-350	Yes	Yes	Water	NT	NT	NT	N	T NT	5	1	Product	Yes	Pass
Fill Sump	Veeder-Root	Unk	Yes	Yes	Clean/Dry	NT	NT	NT	N	T NT	5	6	Product	NP	Pass
Fill Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	T NT	12	2	Product	Yes	Pass
Fill Sump The sensor was 1	Veeder-Root not located at the lo	TLS-350 owest point in the	No tank. Technicia	Yes an lowered it a	Water nd activetd an alarm.	NT	NT	NT	N	T NT	15	1	Product	Yes	Pass
Fill Sump	Veeder-Root	Unk	Yes	Yes	Water	NT	NT	NT	N	T NT	5	6	Product	Yes	Pass

Sensor	Panel	Panel	At Low	Wiring	Condition		L	iquid Test	ting				F	lip Testing	g	
Location	Make	Model	Point	OK	of Location	Resp	Rec	Alarm	PSD	Res	ult	Resp	Rec	Alarm	PSD	Result
Fill Sump Contains a substa	Veeder-Root antial amount of wa	TLS-350 ater.	No	Yes	Water	NT	NT	NT	N	NT	NT	5	1	Product	NP	Pass
Fill Sump	Veeder-Root	Unk	Yes	Yes	Clean/Dry	NT	NT	NT	N	NT	NT	5	6	Product	Yes	Pass
Fill Sump The sensor was n	Veeder-Root ot at the lowest po	TLS-350 int in the tank.	Yes	Yes	Clean/Dry	NT	NT	NT	N	NT	NT	5	1	Product	Yes	Pass
Fill Sump Sump has 4-5 inc	Veeder-Root hes of water. Tech	Unk mician was waitin	Yes ag for maintina	Yes nce to clean th	Water e water before putting back	NT ck the sensor.	NT	NT	Ν	NT	NT	5	5	Product	Yes	Pass
Fill Sump Sump has 4-5 inc	Veeder-Root hes of water. Tech	Unk mician was waitin	Yes ng for maintina	Yes nce to clean th	Water e water before putting bac	NT ck the sensor.	NT	NT	N	NT	NT	5	5	Product	Yes	Pass
Piping Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	VТ	NT	6	4	Product	Yes	Pass
Pump Sump Alarm was set at	Veeder-Root the control panel.	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	NT	NT	Unk	Unk	Product	NP	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Water	5	2	Product	Y	es .	Pass	NT	NT	NT	NT	NT
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Water	5	2	Product	Y	es	Pass	NT	NT	NT	NT	NT
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Water	5	2	Product	Y	es	Pass	NT	NT	NT	NT	NT
Pump Sump Flip Test- estimat	Veeder-Root ted response of 10	TLS-350 seconds.	Yes	Yes	Water	NT	NT	NT	N	NT	NT	10	10	Product	NP	Pass
Pump Sump Flip Test- estimat	Veeder-Root ted response of 10	TLS-350 seconds	Yes	Yes	Clean/Dry	NT	NT	NT	N	NT	NT	10	10	Product	NP	Pass
Pump Sump Alarm was set at	Veeder-Root the control panel.	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	NT	NT	Unk	Unk	Product	NP	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	VΤ	NT	8	2	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Water	NT	NT	NT	1	VТ	NT	6	2	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	5	5	Product	Y	es es	Pass	NT	NT	NT	NT	NT
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Product	NT	NT	NT	N	VΤ	NT	5	2	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	NT	NT	10	5	Product	Yes	Pass
Pump Sump The cable is too s	Veeder-Root short to test sensor	TLS-350 in liquid, Instead	Yes perform a flip	Yes test.	Clean/Dry	NT	NT	NT	N	NT	NT	5	5	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	NT	NT	8	2	Product	Yes	Pass

Sensor	Panel	Panel	At Low	Wiring	Condition			iquid Tesi	_				F	lip Testin <sub>i</sub>	g	
Location	Make	Model	Point	OK	of Location	Resp	Rec	Alarm	PSD	Resu	lt F	esp	Rec	Alarm	PSD	Result
Pump Sump Flip Test- estima	Veeder-Root ted response of 10	TLS-350 seconds	Yes	Yes	Clean/Dry	NT	NT	NT	N	NT 1	NT	10	10	Product	NP	Pass
Pump Sump	Veeder-Root	TLS-350	No	Yes	Clean/Dry	NT	NT	NT	N	IT I	NT	1	1	Both	NP	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Water	NT	NT	NT	N	IT I	NT	5	1	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	No	Yes	Product	NT	NT	NT	N	IT I	NT	5	1	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	I TI	NT	5	1	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	I TI	NT	5	1	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	10	4	Product	Y	es P	ass	NT	NT	NT	NT	NT
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	12	4	Product	Y	es P	ass	NT	NT	NT	NT	NT
Pump Sump Alarm was set at	Veeder-Root the control panel.	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	I TI	NT I	Jnk	Unk	Product	NP	Pass
Pump Sump	Veeder-Root	TLS-350	No	Yes	Clean/Dry	NT	NT	NT	N	IT I	NT	1	1	Both	NP	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	I TI	ЛТ	8	4	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	10	4	Product	Y	es P	ass	NT	NT	NT	NT	NT
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	I TI	NT	6	4	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	No	Yes	Clean/Dry	NT	NT	NT	N	NT 1	NT	1	1	Both	NP	Pass
Pump Sump	Unk	Unk	Yes	Yes	Clean/Dry	NT	NT	NT	N	I TI	NT	6	6	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	5	5	Product	Y	es P	ass	NT	NT	NT	NT	NT
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	I TI	NT	2	Unk	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	I TI	NT	2	Unk	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	8	4	Product	Y	es P	ass	NT	NT	NT	NT	NT
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	I TI	ЛТ	10	15	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	7	5	Product	Y	es P	ass	NT	NT	NT	NT	NT
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	10	5	Product	Y	es P	ass	NT	NT	NT	NT	NT
Pump Sump Cable was too sh	Veeder-Root ort to allow for test	TLS-350 ting in liquid. Fli	Yes p test was used	Yes	Clean/Dry	NT	NT	NT	N	I T	NT	5	5	Product	Yes	Pass
Pump Sump Cable was too sh	Veeder-Root ort to allow for test	TLS-350 ting in liquid. Fli	Yes p test was used	Yes	Clean/Dry	NT	NT	NT	N	I TI	NT	5	5	Product	Yes	Pass

Sensor	Panel	Panel	At Low	Wiring	Condition		$\boldsymbol{L}$	iquid Tesi	ting			F	lip Testin	$\boldsymbol{g}$	
Location	Make	Model	Point	OK	of Location	Resp	Rec	Alarm	PSD	Result	Resp	Rec	Alarm	PSD	Result
Pump Sump Cable was too sh	Veeder-Root ort to allow for tes	TLS-350 ting in liquid. Fli	Yes p test was used	Yes	Clean/Dry	NT	NT	NT	N	T N	Γ 5	5	Product	Yes	Pass
Pump Sump Tested 4 of VR 2	Veeder-Root 208 sensors, all 4 al	TLS-350 arms were set.	Yes	Yes	Clean/Dry	NT	NT	NT	N	T N	Γ Unk	Unk	Product	Unk	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	T N	Γ Unk	Unk	Product	Unk	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	T N	Γ Unk	Unk	Product	Unk	Pass
Pump Sump	Veeder-Root	Unk	Yes	Yes	Water	NT	NT	NT	N	T N	Γ 5	6	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	T N	Γ 10	15	Product	Yes	Pass
Pump Sump	Veeder-Root oduct in the sump.	TLS-350 Sensor was raise	No d above the pro	Yes oduct level. Se	Product ensor in pump sump was no	NT ot programmed	NT to shut o	NT lown pump	N o.	T N	Γ 3	3	Product	NP	Pass
Pump Sump Fill bucket was d	Veeder-Root letached. Stick was	Unk in the product lir	No ne (to prevent th	Yes ne flapper from	Water n shutting down the flow)	25	17	Water	Y	es Pa	ss NT	NT	NT	NT	NT
Pump Sump fill bucket was d	Veeder-Root letached. Stick was	Unk in the product lir	No ne (to prevent th	Yes ne flapper from	Water n shutting down the flow)	20	20	Water	Y	es Pa	ss NT	NT	NT	NT	NT
Pump Sump Fill bucket was d	Veeder-Root letached. Stick was	Unk in the product lir	No ne (to prevent th	Yes ne flapper from	Water n shutting down the flow)	20	20	Water	Y	es Pa	ss NT	NT	NT	NT	NT
Pump Sump Sensor timed out	Veeder-Root & Technician had	Unk to go and re-set i	No t to shut down t	Yes the pump.	Water	20	15	Water	Y	es Pa	ss NT	NT	NT	NT	NT
Pump Sump Sensor timed out	Veeder-Root & Technician had	Unk to go and re-set i	No t to shut down t	Yes the pump.	Water	25	30	Water	Y	es Pa	ss NT	NT	NT	NT	NT
Pump Sump Sensor timed out	Veeder-Root & Technician had	Unk to go and re-set i	No t to shut down t	Yes the pump.	Water	20	30	Water	Y	es Pa	ss NT	NT	NT	NT	NT
Pump Sump Sensor timed out	Veeder-Root & Technician had	Unk to go and re-set i	No t to shut down t	Yes the pump.	Water	20	20	Water	Y	es Pa	ss NT	NT	NT	NT	NT
Pump Sump Fill bucket was d	Veeder-Root letached. Stick was	Unk in the product lin	No ne (to prevent th	Yes ne flapper from	Water n shutting down the flow). I	20 Most of sensor	15 s timed	Water out & Tech	Y nician h			NT shut dov	NT vn the pump	NT	NT
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	T N	Γ Unk	Unk	Product	Unk	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	T N	Γ 3	5	Product	Yes	Pass
	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	T N	Γ 3	3	Product	Yes	Pass
Pump Sump															
Pump Sump Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	T N	Γ 2	2	Product	Yes	Pass

Sensor	Panel	Panel	At Low	Wiring	Condition		L	iquid Tesi	ting			F	lip Testing	g	
Location	Make	Model	Point	OK	of Location	Resp	Rec	Alarm	PSD	Result	Resp	Rec	Alarm	PSD	Result
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	IT NT	5	5	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	T NT	5	5	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	No	Yes	Water	NT	NT	NT	N	IT NT	2	Unk	Product	Yes	Pass
2 sensors, 1 raised	d in sump and the o	ther was a the lov	west point. Bo	th responded a	and activated pump shut o	ff. Picture of se	ensor wa	s taken.							
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Water	NT	NT	NT	N	IT NT	2	Unk	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	IT NT	5	5	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	15	5	Product	Y	es Pass	NT	NT	NT	NT	NT
Pump Sump	Veeder-Root	TLS-350	No	Yes	Clean/Dry	NT	NT	NT	N	IT NT	5	5	Product	Yes	Pass
Sensor was raised	about 4 inches fro	m the bottom of t	he sump.												
Pump Sump	Veeder-Root	TLS-350	No	Yes	Product	NT	NT	NT	N	IT NT	3	3	Product	NP	Pass
2-3 gallons of pro	duct in the sump.	Sensor was raised	l above the pro	duct level. Se	nsor in pump sump was n	ot programmed	to shut o	lown pump	).						
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	IT NT	15	10	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	T NT	12	10	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	T NT	10	10	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	No	Yes	Product	NT	NT	NT	N	IT NT	8	10	Product	Yes	Pass
Product is leaking	g out of the top of the	he turbine pump.													
Pump Sump	Veeder-Root	TLS-350	No	Yes	Product	NT	NT	NT	N	IT NT	8	10	Product	Yes	Pass
Product is leaking	g out of the top of the	he turbine pump.													
Pump Sump	Veeder-Root	TLS-350	No	Yes	Product	NT	NT	NT	N	IT NT	8	10	Product	Yes	Pass
Product is leaking	g out of the top of the	he turbine pump.													
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	IT NT	6	Unk	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	IT NT	6	Unk	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	T NT	10	15	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	T NT	3	5	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	IT NT	4	4	Product	Yes	Pass
Noticed a 1" hole	in the sump, which	n will need to be r	epaired in ord	er to have tigh	t secondary containment.										
Pump Sump	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	N	T NT	5	5	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-300	Yes	Yes	Clean/Dry	NT	NT	NT	N	IT NT	30	Unk	Product	NP	Pass

Sensor	Panel	Panel	At Low	Wiring	Condition		L	iquid Testing				F	lip Testing	g	
Location	Make	Model	Point	OK	of Location	Resp	Rec	Alarm PSD	Re	sult	Resp	Rec	Alarm	PSD	Result
	Veeder-Root in the sump, appro- l sump is not clean	•	No diam. Electrical	Yes wiring below	Clean/Dry penetration lines. Hydros		NT rformed		NT netratio	NT on lines a	4 t 16 minute	5 s per cy	Product rcle.Test at	Yes 16 psi an	Pass d fail if
Pump Sump The contractor de	Veeder-Root ecided to stop testing	TLS-350 ng the sensor afte	No r it failed to res	Yes pond for more	Clean/Dry than 2 minutes and replace		NT sensor.	NT	NT	NT	er 2 m	NA	None	No	Fail
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	4	4	NA	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	3	3	Product	Yes	Pass
Pump Sump	Unk	Unk	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	4	4	Product	Yes	Pass
Pump Sump	Veeder-Root	Unk	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	8	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	1	Both	NP	Pass
Pump Sump Sump has 4-5 inc	Veeder-Root ches of water. Tech	Unk mician was waitir	Yes ng for maintinar	Yes nee to clean the	Water e water before putting bac		NT	NT	NT	NT	5	5	Product	Yes	Pass
Pump Sump Sump has 4-5 inc	Veeder-Root ches of water. Tech	Unk mician was waitir	Yes ng for maintinar	Yes ace to clean the	Water e water before putting bac		NT	NT	NT	NT	5	5	Product	Yes	Pass
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	10	15	Product	Yes	Pass
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	15	Unk	Product	Unk	Pass
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	10	5	Product	Yes	Pass	NT	NT	NT	NT	NT
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	6	4	Product	Yes	Pass
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	6	4	Product	Yes	Pass
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	15	10	Product	Yes	Pass	NT	NT	NT	NT	NT
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	10	15	Product	Yes	Pass
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	6	4	Product	Yes	Pass
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	10	15	Product	Yes	Pass
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	10	15	Product	Yes	Pass
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	8	2	Product	Yes	Pass
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	15	Unk	Product	Unk	Pass
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	15	Unk	Product	Unk	Pass

Sensor	Panel	Panel	At Low	Wiring	Condition		L	iquid Tesi	ting			1	Flip Testin	g	
Location	Make	Model	Point	OK	of Location	Resp	Rec	Alarm	PSD	Resul	t Res	p Rec	Alarm	PSD	Result
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	IT N	NT 15	Unk	Product	Unk	Pass
Tested six dispe	nsers, all passed-ala	rms set (total of	six triggers), all	six sensors (V	/R 208) are working.										
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	IT N	NT 10	10	Product	NP	Pass
Flip Test- estima	ated response of 10	seconds													
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	IT N	NT 8	2	Product	Yes	Pass
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	IT N	NT 8	2	Product	Yes	Pass
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	IT N	NT 8	2	Product	Yes	Pass
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	IT N	NT 8	2	Product	Yes	Pass
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	IT N	NT 8	2	Product	Yes	Pass
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	15	10	Product	Y	es Pa	ass NT	NT	NT	NT	NT
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	IT N	NT 6	4	Product	Yes	Pass
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	10	5	Product	Y	es Pa	ass NT	NT	NT	NT	NT
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	IT N	VT 10	10	Product	NP	Pass
Flip Test- estima	ated response of 10	seconds													
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	IT N	NT 10	10	Product	NP	Pass
Flip Test- estima	ated response of 10	seconds													
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	IT N	NT 10	10	Product	NP	Pass
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	IT N	VT 10	10	Product	NA	Pass
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	IT N	NT 10	10	Product	NP	Pass
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	IT N	NT 6	4	Product	Yes	Pass
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	IT N	NT 6	4	Product	Yes	Pass
UDC	Veeder-Root	Unk	Yes	Yes	Clean/Dry	20	20	Water	Y	es Pa	ass NT	NT	NT	NT	NT
		to go and re-set i			hnician conducts water an	d flip test in so	ne of the								
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	IT N	NT 15	Unk	Product	Unk	Pass
UDC	Veeder-Root	Unk	Yes	Yes	Clean/Dry	20	25	Water	v	es Pa	ass NT	NT	NT	NT	NT
					hnician conducts water an									111	111
UDC	Veeder-Root	Unk	Yes	Yes	Clean/Dry	22	22	Water				NT	NT	NT	NT
					hnician conducts water an									111	111
				1 1		1								I Inla	Pass
					,				ecause th	ne wire	did not reach the				Ink

Sensor	Panel	Panel	At Low	Wiring	Condition		1	Liquid Testing				F	lip Testing	g	
Location	Make	Model	Point	OK	of Location	Resp	Rec	Alarm PS	D R	esult	Resp	Rec	Alarm	PSD	Result
UDC	Veeder-Root	Unk	Yes	Yes	Clean/Dry	22	22	Water	Yes	Pass	NT	NT	NT	NT	NT
UDC	Veeder-Root	Unk	Yes	Yes	Clean/Dry	21	21	Water	Yes	Pass	NT	NT	NT	NT	NT
Sensor timed out	& Technician had	to go and re-set i	t to shut down t	the pump. Tec	hnician conducts water an	nd flip test in sor	ne of th	ne sensors becaus	e the	wire did not i	reach te w	ater bu	cket.		
UDC	Veeder-Root	Unk	Yes	Yes	Clean/Dry	25	22	Water	Yes			NT	NT	NT	NT
					hnician conducts water an										
UDC	Veeder-Root	Unk	Yes	Yes	Clean/Dry	22	22	Water	Yes	Pass	NT	NT	NT	NT	NT
UDC	Veeder-Root	Unk	Yes	Yes	Clean/Dry	20	20	Unk	Unk			NT	NT	NT	NT
Sensor timed out			t to shut down t	the pump. Tec	hnician conducts water an	id flip test in soi			e the						
Unk	Veeder-Root	TLS-350	No	Yes	Water	NT	NT	NT	NT	NT	2	2	Product	No	Fail
	e PSD is functioning		utdown. ( print	er said pump s	shutdown occurred, but pu	imp continued to	o run.	Picture of Sensor	is site	7 #2.). FOIIO	w up was	done c	on this site a	na inspe	ctor
Vault	Gilbarco	Unk	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	2	2	Product	NP	Pass
Single wall steel t	ank inside a Vault	. Vapor recovery	fill bucket is ha	alf way full of	water.										
Sensor Model	: 794380-209			Operati	ng Principle: Float Sv	witch									
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Water	NT	NT	NT	NT	NT	12	Unk	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	12	Unk	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	12	Unk	Product	Yes	Pass
Sensor Model	: 794380-300			Operati	ng Principle: Float Sv	witch									
Tank Interstice	Veeder-Root	TLS-300	NA	Yes	Brine-Filled	2	2	Water	NA	Pass	NT	NT	NT	NT	NT
Sensor Model	: 794380-301			Operati	ng Principle: Float Sv	witch									
Tank Interstice	Veeder-Root	Simplicity	Yes	Yes	Brine-Filled	NT	NT	NT	NT	NT	6	1	Both	Yes	Pass
Tank Interstice	Veeder-Root	Simplicity	Yes	Yes	Brine-Filled	NT	NT	NT	NT	NT	6	1	Both	Yes	Pass
Tank Interstice	Veeder-Root	Simplicity	Yes	Yes	Brine-Filled	NT	NT	NT	NT	NT	6	1	Both	Yes	Pass
Sensor Model	: 794380-302			Operati	ng Principle: Float Sv	witch									
Tank Interstice	Veeder-Root	TLS-350	NA	Yes	Brine-Filled	20	15	Water	NA	Pass	NT	NT	NT	NT	NT
Technician lifted	sensor out of brine	e reservoir to acti	vate the "low w	ater level" ala	rm.										
Tank Interstice	Veeder-Root	TLS-350	NA	Yes	Brine-Filled	10	Unk L	ow Brine Level	Yes	Pass	NT	NT	NT	NT	NT
Tank Interstice	Veeder-Root	TLS-350	NA	Yes	Brine-Filled	10	Unk L	ow Brine Level	Yes	Pass	NT	NT	NT	NT	NT

Sensor	Panel	Panel	At Low	Wiring	Condition			Liquid Test	_				F	lip Testing	g	
Location	Make	Model	Point	OK	of Location	Resp	Rec	c Alarm	PSD	Resul	lt	Resp	Rec	Alarm	PSD	Result
Tank Interstice Fechnician lifted s	Veeder-Root sensor out of brine	TLS-350 e reservoir to activ	NA vate the "low w	Yes ater level" alaı	Brine-Filled rm.	20	15	Water	N	A P	ass	NT	NT	NT	NT	NT
Tank Interstice Fechnician lifted s	Veeder-Root sensor out of brine	TLS-350 e reservoir to activ	NA vate the "low w	Yes ater level" alaı	Brine-Filled rm.	30	10	Water	N	A P	ass	NT	NT	NT	NT	NT
Tank Interstice	Veeder-Root	TLS-350	NA	Yes	Brine-Filled	5	5	Product	Y	es P	ass	NT	NT	NT	NT	NT
Tank Interstice	Veeder-Root	TLS-350	NA	Yes	Brine-Filled	10	Unk I	Low Brine Le	vel Y	es Pa	ass	NT	NT	NT	NT	NT
Tank Interstice Technician lifted s	Veeder-Root sensor out of brine	TLS-350 e reservoir to activ	NA vate the "low w	Yes ater level" alar	Brine-Filled rm.	30	10	Water	N	A P	ass	NT	NT	NT	NT	NT
Sensor Model:	: 794380-408			Operatii	ng Principle: Float Switch											
UDC Alarm set at the co	Veeder-Root ontrol panel, senso	TLS-350 or is not programm	Yes ned for pump s	Yes hut down or di	Clean/Dry ispenser shut down.	NT	NT	NT	N	T N	NT	6	Unk	Product	NP	Pass
UDC Alarm set at the co	Veeder-Root ontrol panel, senso	TLS-350 or is not programm	Yes ned for pump s	Yes hut down or di	Clean/Dry ispenser shut down.	NT	NT	NT	N	T N	NT	6	Unk	Product	NP	Pass
UDC Alarm set at the co	Veeder-Root ontrol panel, senso	TLS-350 or is not programm	Yes ned for pump s	Yes hut down or di	Clean/Dry ispenser shut down.	NT	NT	NT	N	T N	NT	6	Unk	Product	NP	Pass
UDC Alarm set at the co	Veeder-Root ontrol panel, senso	TLS-350 or is not programm	Yes ned for pump s	Yes hut down or di	Clean/Dry ispenser shut down.	NT	NT	NT	N	T N	ЛТ	6	Unk	Product	NP	Pass
Sensor Model:	: 794380-500			Operatii	ng Principle: Float Switch											
Tank Interstice	Veeder-Root	TLS-300	NA	Yes	Brine-Filled	2	2	Water	N	A P	ass	NT	NT	NT	NT	NT
ensor Model:	794390-205			Operatii	ng Principle: Float Switch											
Fill Sump Sump had oil in it	Veeder-Root . Sensor was raise	TLS-350 ed above the oil, b	No out alarmed wh	Yes en technician l	Product owered it into the oil. Contract	NT tor was no	NT tified t	NT o pump out th	N ne oil th		NT	NT	NT	NT	NT	NT
Fill Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	5	5	Product	N	A P	ass	NT	NT	NT	NT	NT
Fill Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	5	5	Product	N	A P	ass	NT	NT	NT	NT	NT
Fill Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	T N	NT	5	Unk	Product	NP	Pass
Fill Sump Sensor was Gilbar	Gilbarco rco equivalent of V	EMC Veeder Root Mod	Yes el 794380-205.	Yes Cable was to	Clean/Dry o short to test the sensor in liqu	NT iid, so flip	NT test wa	NT as used.	N	T N	NT	10	10	Product	Yes	Pass
Fill Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	T N	ЛТ	10	6	Product	NP	Pass
Fill Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	T N	ЛТ	10	6	Product	NP	Pass

Sensor	Panel	Panel	At Low	Wiring	Condition		L	iquid Test	ting			F	lip Testin	g	
Location	Make	Model	Point	OK	of Location	Resp	Rec	Alarm	PSD	Result	Resp	Rec	Alarm	PSD	Result
Fill Sump Sensor was Gilba	Gilbarco arco equivalent of V	EMC /eeder Root Mod	Yes lel 794380-205.	Yes Cable was to	Clean/Dry so short to test the sensor i		NT test was	NT used.	N	T N	Γ 5	5	Product	Yes	Pass
Pump Sump sensor is not prog	Veeder-Root grammed for positive	TLS-350 we shut down, only	Yes ly sets an audib	Yes le alarm.	Water	NT	NT	NT	N	T N	Γ 90	Unk	Product	NP	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	T N	Γ 8	6	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	T N	Γ 10	6	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	T N	Γ 10	10	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	T N	Γ 10	5	Product	Yes	Pass
Pump Sump Some condensation	Veeder-Root on on sump.	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	T N	Γ 25	5	Both	Yes	Pass
Pump Sump sensor is not prog	Veeder-Root grammed for positive	TLS-350 we shut down, only	Yes ly sets an audib	Yes le alarm.	Clean/Dry	NT	NT	NT	N	T N	Γ 90	Unk	Product	NP	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	5	5	Product	Y	es Pas	ss NT	NT	NT	NT	NT
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	10	5	Product	Y	es Pas	ss NT	NT	NT	NT	NT
Pump Sump sensor is not prog	Veeder-Root grammed for positive	TLS-350 we shut down, only	Yes ly sets an audib	Yes le alarm.	Clean/Dry	NT	NT	NT	N	T N	Г 90	Unk	Product	NP	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	T N	Γ 15	5	Both	Yes	Pass
Pump Sump l inch of kerosen	Veeder-Root e in sump; this sen	TLS-350 sor was tested wi	Yes th just an alarm	Yes n first; retesting	Product g while running pump and	NT I the pump did n	NT ot shut o	NT off.	N	T N	Γ 5	1	Both	NP	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	T N	Γ 20	5	Both	Yes	Pass
Pump Sump Sensor was Gilba	Gilbarco arco equivalent of V	EMC Veeder Root Mod	Yes lel 794380-205.	Yes Cable was to	Clean/Dry so short to test the sensor i		NT test was	NT used.	N	T N	Γ 10	10	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	T N	Γ 20	10	Product	Yes	Pass
Pump Sump For this tank, the	Veeder-Root re are two sumps, b	TLS-350 out only one sense	Yes or (the sumps a	Yes re linked).	Clean/Dry	NT	NT	NT	N	T N	Γ 15	5	Both	Yes	Pass
Pump Sump ensor was Gilba	Gilbarco arco equivalent of V	EMC /eeder Root Mod	Yes lel 794380-205.	Yes Cable was to	Clean/Dry so short to test the sensor i	NT in liquid, so flip	NT test was	NT used.	N	T N	Γ 5	5	Product	Yes	Pass
Pump Sump ensor was raised	Veeder-Root d approximately 1 f	TLS-350 Foot from bottom	No of the sump.	Yes	Clean/Dry	NT	NT	NT	N	T N	Γ 15	10	Product	Yes	Pass

Sensor	Panel	Panel	At Low	Wiring	Condition		L	iquid Tes	ting			F	lip Testin	g	
Location	Make	Model	Point	OK	of Location	Resp	Rec	Alarm	PSD Re	sult	Resp	Rec	Alarm	PSD	Resul
Pump Sump	Veeder-Root	TLS-350	Unk	Yes	Water	NT	NT	NT	NT	NT	5	2	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	15	10	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	10	10	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	2	1	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	1	Product	Yes	Pass
Tank Interstice Diesel tank interst	Veeder-Root ice 50m from sum	TLS-350 p.	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	20	5	Both	Yes	Pass
Tank Sump Suction system wi	Veeder-Root th tank top sump.	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	25	Unk	Product	NP	Pass
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	4	1	Product	Yes	Pass
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	4	1	Product	Yes	Pass
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	4	1	Product	Yes	Pass
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	4	1	Product	Yes	Pass
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	4	1	Product	Yes	Pass
ensor Model:	794390-407			Operati	ng Principle: Float S	witch									
	Veeder-Root cated at the top of nsor was repaired.	TLS-350 the tank, at the a	No ccess port. The	No e pull-string w	Clean/Dry as broken. Inspector said		NT fixed im	NT mediately.	NT The sensor	NT was not fo	NT unctionally		NT luring this i	NT	NT n. Afollo
Γank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	NP	Pass
Γank Interstice Wrap-around sens	Veeder-Root or. Techician mo	TLS-350 wed sensor toward	Yes d top of tank ur	Yes ntil alarm soun	Clean/Dry ded. Did not completely	NT remove the sens	NT sor.	NT	NT	NT	5	5	Product	NP	Pass
Γank Interstice Vrap-around sens	Veeder-Root or. Techician mov	TLS-350 wed sensor toward	Yes d top of tank ur	Yes ntil alarm soun	Clean/Dry ded. Did not completely	NT remove the sens	NT sor.	NT	NT	NT	5	5	Product	NP	Pass
Tank Interstice Vrap-around sens	Veeder-Root or. Techician mo	TLS-350 wed sensor toward	Yes d top of tank ur	Yes ntil alarm soun	Clean/Dry ded. Did not completely	NT remove the sens	NT sor.	NT	NT	NT	5	5	Product	NP	Pass
ank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	NP	Pass
Γank Interstice	Veeder-Root	TLS-350	Yes	Yes	Unk	NT	NT	NT	NT	NT	1	1	Both	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Water	NT	NT	NT	NT	NT	5	5	Product	NP	Fail

Sensor	Panel	Panel	At Low	Wiring	Condition		L	iquid Tes	ting			I	lip Testin	g	
Location	Make	Model	Point	OK	of Location	Resp	Rec	Alarm	PSD	Result	Resp	Rec	Alarm	PSD	Result
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	IT NT	5	5	Product	Yes	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	IT NT	10	10	Product	NP	Pass
Technician pulled	sensor around the	e tank until alarm	activated, but of	lid not fully re	move the sensor from the	annular space.									
Tank Interstice	Veeder-Root	TLS-350	NA	Yes	Clean/Dry	NT	NT	NT	N	IT NT	2	10	Product	Yes	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	IT NT	Unk	Unk	Product	NP	Pass
Alarm was set du	ring the removal o	f the sensor from	the tank interst	ice.											
Tank Interstice	Veeder-Root	TLS-350	NA	Yes	Clean/Dry	NT	NT	NT	N	IT NT	2	15	Product	Yes	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	T NT	Unk	Unk	Product	NP	Pass
Alarm was set du	ring the removal o	f the sensor from	the tank interst	ice.											
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Unk	NT	NT	NT	N	IT NT	1	1	Both	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	IT NT	10	10	Product	NP	Pass
Technician pulled	l sensor around the	e tank until alarm	activated, but of	lid not fully re	move the sensor from the	annular space.									
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	T NT	5	5	Product	NP	Fail
Sensor would not	go into alarm unt	il the techician sh	ook it vigorous	ly. Float was	stuck.										
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	IT NT	10	10	Product	NP	Pass
Technician pulled	l sensor around the	e tank until alarm	activated, but of	lid not fully re	move the sensor from the	annular space.									
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Unk	NT	NT	NT	N	IT NT	1	1	Both	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	IT NT	10	10	Product	NP	Pass
Technician pulled	sensor around the	e tank until alarm	activated, but of	lid not fully re	move the sensor from the	annular space.									
Sensor Model	: 794390-409			Operati	ng Principle: Float Sv	witch									
Tank Interstice	Veeder-Root	TLS-350	NA	Yes	Clean/Dry	NT	NT	NT	N	T NT	3	2	Product	Yes	Pass
Tank Interstice	Veeder-Root	TLS-350	Unk	Yes	Clean/Dry	NT	NT	NT	N	IT NT	1	1	Both	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Unk	Yes	Clean/Dry	NT	NT	NT	N	IT NT	1	1	Both	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Water	NT	NT	NT	N	IT NT	2	2	Product	Yes	Pass
Tank Interstice	Veeder-Root	TLS-350	Unk	Yes	Clean/Dry	NT	NT	NT	N	IT NT	1	1	Both	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry		NT	NT		T NT		Unk	Product		Pass
	ip for pump shut of		103	103	Clouis Diy	111	-11	111	1		,	Olik	Troduct	111	1 433
Tank Interstice	Veeder-Root	Unk	Yes	Yes	Clean/Dry	NT	NT	NT	N	IT NT	17	17	Product	Yes	Pass
Three tanks (1 sp	lit gasoline tank &	à 2 diesel tanks)			, and the second										
Tank Interstice	Veeder-Root	Unk	Yes	Yes	Clean/Dry	NT	NT	NT	N	IT NT	20	20	Product	Yes	Pass

Sensor	Panel	Panel	At Low	Wiring	Condition		L	iquid Tes	ting			F	lip Testinį	g	
Location	Make	Model	Point	OK	of Location	Resp	Rec	Alarm	PSD Re	sult	Resp	Rec	Alarm	PSD	Resul
Tank Interstice	Veeder-Root	Unk	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	20	20	Product	Yes	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	15	Unk	Product	NP	Pass
Tank Interstice Tested 4 of 409 se	Veeder-Root nsors, all appeare	TLS-350 d to be dry and cl	Yes ean; alarms set	Yes for all sensors	Clean/Dry	NT	NT	NT	NT	NT	15	Unk	Product	NP	Pass
Tank Interstice Flip Test - Approx	Veeder-Root simately 10 Secon	TLS-350 ads.	Yes	Yes	Unk	NT	NT	NT	NT	NT	10	10	Product	NP	Pass
Tank Interstice Flip Test - Approx	Veeder-Root simately 10 Secon	TLS-350 ads.	Yes	Yes	Unk	NT	NT	NT	NT	NT	10	10	Product	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	15	Unk	Product	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	Unk	Product	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	15	Unk	Product	Unk	Pass
Tank Interstice Sensor is not set u	Veeder-Root p for pump shut d	TLS-350 lown.	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	9	Unk	Product	NP	Pass
Tank Interstice Sensor was wedge no way of knowin			Unk ary tank walls a	Yes and cannot be	Clean/Dry removed to verify sensor t	NT type. Alarm was	NT s set at th	NT ne control p	NT anel by pulli	NT ng it. The		Unk me was	Product s estimated	NP because	Fail there wa
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	45	Unk	Product	NP	Pass
Follow up was ma sensor is working		th the local agneo	ey and assured	that next day,	the contractor replaced the	e broken sensor	s. Inspec	tor did not	re-inspect, b	ut receive	d a report f	rom the	contractor	indicatin	g that th
Tank Interstice Sensor was wedge	Veeder-Root ed between the pri	TLS-350 mary and seconds	Unk ary tank walls a	Unk and cannot be	Clean/Dry removed to verify sensor t	NT type. Alarm was	NT s not set a	NT at the contr	NT ol panel by p	NT oulling it li	None ke the prev		None o tanks.	NP	Fail
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	Unk	Product	NP	Pass
Tank Interstice Flip Test - Approx	Veeder-Root simately 10 Secon	TLS-350 ads.	Yes	Yes	Unk	NT	NT	NT	NT	NT	10	10	Product	NP	Pass
Sensor Model	794390-420			Operati	ng Principle: Float S	witch									
Piping Sump 3 small steel pipes	Veeder-Root	TLS-350	Yes thin one large s	Yes	Clean/Dry e sensor monitors the larg	NT e pipe, which st	NT ays dry u	NT inless the s	NT mall pipes le	NT ak.	5	5	Product	NP	Pass
Piping Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry e sensor monitors the larg	NT	NT	NT	NT	NT	5	5	Product	NP	Pass
Piping Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry e sensor monitors the larg	NT	NT	NT	NT	NT	5	5	Product	NP	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	Yes	Pass
All times are	recorded in seco	onds and height											x VI, Tabl		

Sensor	Panel	Panel	At Low	Wiring	Condition		L	iquid Test	ting				F	lip Testin	g	
Location	Make	Model	Point	OK	of Location	Resp	Rec	Alarm	PSD	Resu	lt	Resp	Rec	Alarm	PSD	Result
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	NT I	NT	5	5	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	No	No	Water	NT	NT	NT	N	NT 1	NT	5	5	Product	NP	Pass
Waste oil contain	ed oil/water arour	nd the tank sump.	The sensor was	s not located in	the lowest point.											
Pump Sump The sump contain	Veeder-Root ned product.	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	NT 1	NT	4	2	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-320	Yes	Yes	Clean/Dry	NT	NT	NT	N	NT 1	NT	4	2	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Water/Product	NT	NT	NT	N	NT 1	NT	10	5	Product	Yes	Pass
Sensor was sitting	g in 3-4 inches of	water/product but	was not in alar	m. However,	sensor activated alarm wl	hen flipped.										
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	NT I	NT	5	5	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	NT I	NT	5	5	Product	Yes	Pass
Tank Interstice	Veeder-Root	TLS-350	NA	NA	Clean/Dry	NT	NT	NT	N	NT 1	NT	5	3	Product	NP	Pass
Tank Interstice	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	N	NT 1	NT	5	5	Product	NP	Pass
Tank Interstice	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	N	NT ]	NT	1	1	Product	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Unk	Yes	Clean/Dry	NT	NT	NT	N	NT 1	NT	1	1	Product	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Unk	Yes	Clean/Dry	NT	NT	NT	N	NT 1	NT	1	1	Product	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	NA	NA	Clean/Dry	NT	NT	NT	N	NT 1	NT	5	3	Product	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	NT 1	NT	5	5	Product	Yes	Pass
Contractor menti	oned that this type	e of sensors are co	nstantly cracking	ng and split ou	t in age(chronic problem)	). Maybe it's a d	esign pro	oblem.Even	when s	sensors	are cracked	d, contra	ictor us	ually don't	replace t	hem.
Tank Interstice	Veeder-Root	Unk	No	Yes	Water	NT	NT	NT	N	NT 1	NT	4	4	Product	Yes	Pass
Interstitial space	is full of water. Te	echnician could no	ot put back the	sensor without	calling the maintenance	to remove water	. Sensor	was not at	lowest p	ooint an	d wire was	wrappe	ed up.			
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	5	5	Product	Y	es P	ass	NT	NT	NT	NT	NT
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	NT 1	NT	5	5	Product	NP	Pass
Sensor casing wa	as corroded and cr	acked. This is a c	chronic problen	n with this mod	del. Even when cracked, o	contractor does r	not replac	ce them bed	cause th	ey all te	nd to be li	ke that a	ıfter a v	while.		
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	5	5	Product	Y	es P	ass	NT	NT	NT	NT	NT
Tank Interstice	Veeder-Root	Unk	No	Yes	Water	NT	NT	NT	N	NT 1	NT	4	4	Product	Yes	Pass
Tank Interstice	Veeder-Root	TLS-350	NA	NA	Clean/Dry	NT	NT	NT	N	NT 1	NT	5	3	Product	NP	Pass
Tank Interstice	Veeder-Root	Unk	Yes	Yes	Clean/Dry	NT	NT	NT	N	NT 1	NT	5	5	Product	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	Ŋ	NT 1	NT	25	Unk	Product	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	NT 1	NT	10	Unk	Product	NP	Pass

Sensor Location Tank Interstice	Panel Make Veeder-Root	Panel Model	At Low	Wiring	Condition										
	Veeder-Root		Point	OK	of Location	Resp	Rec	Alarm	PSD	Result	Resp	Rec	Alarm	PSD	Result
		TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	T NT	2	2	Product	NP	Pass
Tank Interstice	Pneumeractor	LC-1000	Yes	Yes	Clean/Dry	NT	NT	NT	N	T NT	2	2	Product	NP	Pass
Tank Interstice	Pneumeractor	LC-1000	Yes	Yes	Clean/Dry	NT	NT	NT	N	T NT	2	2	Product	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	T NT	2	2	Product	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	T NT	2	2	Product	Yes	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Water	NT	NT	NT	N	T NT	5	Unk	Product	NP	Pass
Sensor was wet w	hen removed from	n tank interstice.	It is unknown h	now much liqu	id was in interstice.										
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	T NT	10	Unk	Product	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	T NT	10	Unk	Product	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	5	5	Product	Y	es Pass	NT	NT	NT	NT	NT
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	T NT	10	Unk	Product	NP	Pass
Tank Interstice	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	N	T NT	5	5	Product	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	T NT	10	Unk	Product	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	T NT	5	Unk	Product	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	T NT	5	Unk	Product	Yes	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	T NT	5	Unk	Product	Yes	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	5	5	Product	N	A Pass	NT	NT	NT	NT	NT
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	5	5	Product	Y	es Pass	NT	NT	NT	NT	NT
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	5	5	Product	Y	es Pass	NT	NT	NT	NT	NT
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	5	5	Product	N	A Pass	NT	NT	NT	NT	NT
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	3	3	Product	N	A Pass	NT	NT	NT	NT	NT
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	T NT	10	Unk	Product	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	T NT	5	5	Product	Yes	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	T NT	1	1	Both	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	T NT	2	Unk	Product	Yes	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	T NT	2	2	Product	Yes	Pass

Sensor	Panel	Panel	At Low	Wiring	Condition			iquid Test	_				F	lip Testing	g	
Location	Make	Model	Point	OK	of Location	Resp	Rec	Alarm	PSD	Resu	ılt	Resp	Rec	Alarm	PSD	Result
Tank Interstice	Veeder-Root	TLS-300	No	Yes	Clean/Dry	NT	NT	NT	N	NT	NT	30	Unk	Product	NP	Pass
This sensor is for	steel tanks, and co	ould not be wrapp	ed around the F	G tank. Loca	l agency instructed owner	r to replace.										
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	NΤ	NT	5	5	Product	Yes	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	NT	NT	1	1	Both	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	NT	NT	5	5	Product	Yes	Pass
Tank Interstice Original sensor w	Veeder-Root ras stuck in the int	TLS-350 erstice because of	Yes rust on casing;	Yes sensor was re	Clean/Dry placed. New sensor passo	NT ed test.	NT	NT	N	NT	NT	None	NA	Both	NP	Fail
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	NT	NT	5	5	Product	Yes	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	5	5	Product	Y	es ]	Pass	NT	NT	NT	NT	NT
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	5	5	Product	Y	es ]	Pass	NT	NT	NT	NT	NT
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	NT	NT	5	5	Both	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	NT	NT	5	5	Both	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	NT	NT	2	Unk	Product	Yes	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	NT	NT	5	5	Product	Yes	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	NT	NT	5	5	Product	NP	Pass
Tank Interstice	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	N	NT	NT	5	5	Product	NP	Pass
Tank Interstice Steel sensor casin	Gilbarco ag was split.	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	N	NT	NT	5	5	Product	NP	Pass
Tank Interstice Steel sensor casin	Gilbarco ag was split.	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	N	NT	NT	5	5	Product	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	NΤ	NT	2	2	Product	Yes	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	NT	NT	3	3	Product	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	NT	NT	1	1	Both	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	NT	NT	3	3	Product	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	١T	NT	5	5	Product	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	١T	NT	3	3	Product	NP	Pass
Tank Interstice The sensor was m	Veeder-Root hissing the float. F	TLS-350 ollow up was mad	NA de with local ag	Yes ency and conf	Clean/Dry firmed that the technician		NT sor. How	NT vever, inspe			NT eform re-	None inspection		None	NP	Fail
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	١T	NT	5	5	Product	NP	Pass

Sensor	Panel	Panel	At Low	Wiring	Condition		L	iquid Tes	ting			I	Flip Testing	g	
Location	Make	Model	Point	OK	of Location	Resp	Rec	Alarm	PSD	Result	Resp	Rec	Alarm	PSD	Result
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	T NT	5	5	Product	NP	Pass
Sensor housing	(steel bell) was split	•													
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	T NT	2	2	Product	Yes	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	T NT	2	2	Product	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	T NT	2	2	Product	Yes	Pass
Sensor Mode	1: 794390-460			Operati	ng Principle: Float Switch										
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	T NT	5	5	Product	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	T NT	5	5	Product	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	T NT	5	5	Product	NP	Pass
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	T NT	4	1	Product	Yes	Pass
Sensor Mode	el: 847990-001			Operati	ng Principle: Float Switch										
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	T NT	20	5	Both	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	N	T NT	20	5	Both	Yes	Pass
UDC	Dispenser Cut-off	Unk	Yes	Yes	Clean/Dry	1	MR	Unk	N	A Pass	NT	NT	NT	NT	NT
The sensor cuts	power to dispensers	. Dispenser had	to be manually	reset to clear a	alarm.										
UDC	Dispenser Cut-off	Unk	Yes	Yes	Clean/Dry	2	MR	Unk	N	A Pass	NT	NT	NT	NT	NT
The sensor cuts	power to dispensers	. Dispenser had	to be manually	reset to clear a	alarm.										
UDC	Dispenser Cut-off	Unk	Yes	Yes	Clean/Dry	3	MR	Unk	N	A Pass	NT	NT	NT	NT	NT
The sensor cuts	power to dispensers	. Dispenser had	to be manually	reset to clear a	alarm.										
UDC	Dispenser Cut-off	Unk	Yes	Yes	Clean/Dry	2	MR	Unk	N	A Pass	NT	NT	NT	NT	NT
The sensor cuts	power to dispensers	. Dispenser had	to be manually	reset to clear a	alarm.										
Sensor M	lake: Warr	ick Conti	rols												
Sensor Mode	el: DLP-1-NC			Operati	ng Principle: Float Switch										
Pump Sump	Warrick	Unk	Yes	Yes	Water	NT	NT	NT	N	T NT	None	NA	None	NP	Fail
Sensor was sittir	ng in water and not a	alarmed. Contrac	ctor shook sens	or and float m	oved activating the alarm. Sens	sor passed	retest af	ter 1-2 seco	ond aları	n response.					
Pump Sump	Warrick	Unk	Yes	Yes	Water	NT	NT	NT	N	T NT	Unk	Unk	Both	NP	Pass

## TABLE 3 - Field Data for Discriminating Sensors

	Lo	w Water !	Test			Hig	gh Water T	est			Pr	oduct Tes	sting			i	Flip Testing	g	
Resp	Rec	Alarm	PSD	Result	Resp	Rec	Alarm	PSD	Result	Resp	Rec	Alarm	PSD	Result	Resp	Rec	Alarm	PSD	Result
Sens	or Ma	ake:	Alpha	ı wire															
Sens	or Mo	del	Ur	nk															
NT	NT	NT	NT	NT	NA	NA	NA	NA	NA	NT	NT	NT	NT	NT	60	60	Product	NP	Pass
NT	NT	NT	NT	NT	NA	NA	NA	NA	NA	NT	NT	NT	NT	NT	None	NA	None	NP	Fail
Sens	or Ma	ake:	Emco	)															
Sens	or Mo	del	Q(	0003-001															
60	Unk	Water	NA	Pass	60	Unk	Water	Yes	Pass	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Local	agency d	lid not requ	uire discr	riminating sen	sors to be tested	in prod	luct.												
60	Unk		NA		60		Water	Yes	Pass	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
		_		-	sors to be tested	-													
60		Water	NA 	Pass	60		Water	Yes	Pass	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
		_		_	sors to be tested	-		• •			> rm	N. V.	> rm	N.C.				> rm	> vm
60		Water	NA · · ·		60		Water	Yes	Pass	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
		_		_	sors to be tested	-		**	D	) ITE	) IT	NE	NE	NO	) ITE	) IT	) IT	NE	NUT
60		Water	NA · · ·		60		Water	Yes	Pass	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
					sors to be tested	ın prod	luct.												
Sens	or Mo	del	Q(	0003-002															
60	Unk	Water	NA	Pass	60	Unk	Water	Yes	Pass	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Local	agency d	lid not requ	uire discr	iminating sen	sors to be tested	in prod	luct.												
60	60	Water	NA		60	60	Water	Yes	Pass	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Local		lid not requ	uire discr	riminating sen	sors to be tested	in prod	luct.												
60	60	Water	NA		60	60	Water	Yes	Pass	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Local	agency d	lid not requ	uire discr	iminating sen	sors to be tested	in prod	luct.												
60	Unk	Water	NA		60		Water	Yes	Pass	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Local	agency d	lid not requ	uire discr	riminating sen	sors to be tested	in prod	luct.												
60	Unk	Water	NA	Pass	60	Unk	Water	Yes	Pass	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Local	agency d	lid not requ	uire discr	iminating sen	sors to be tested	in prod	luct.												
60	Unk	Water	NA	Pass	60	Unk	Water	Yes	Pass	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Local	agency d	lid not requ	uire discr	riminating sen	sors to be tested	in prod	luct.												
Sens	or Ma	ake:	Incon	!															
Sens	or Mo	del	TS	SP-DIS															
4	Unk	Both	Yes	Pass	NA	NA	NA	NA	NA	NT	NT	NT	NT	NT	NA	NA	NA	NA	NA
<u> </u>	or Ma	1	N # 11	rv Contr	1														

	Lo	w Water	Test			Hig	gh Water T	est			Pr	oduct Tes	ting			i	Flip Testin	g	
Resp	Rec	Alarm	PSD	Result	Resp	Rec	Alarm	PSD	Result	Resp	Rec	Alarm	PSD	Result	Resp	Rec	Alarm	PSD	Result
Sens	or Mo	del	Po	llulert FD 221	GTRA														
10	Dry	Water	NA	Pass	NA	NA	NA	NA	NA	10	Dry	Product	NA	Pass	NA	NA	NA	NA	NA
Senso	r had to	be wiped d	ry to con	ne out of alarm.															
10	Dry	Water	NA	Pass	NA	NA	NA	NA	NA	10	Dry	Product	NA	Pass	NA	NA	NA	NA	NA
Senso	r had to	be wiped d	ry to con	ne out of alarm.															
10	Dry	Water	NA	Pass	NA	NA	NA	NA	NA	10	Dry	Product	NA	Pass	NA	NA	NA	NA	NA
Senso	r had to	be wiped d	ry to con	ne out of alarm.															
Sens	or Mo			llulert MD 241	1RRA														
10	Dry	Water	NA	Pass	NA	NA	NA	NA	NA	10	Dry	Product	NA	Pass	NA	NA	NA	NA	NA
		-	•	ne out of alarm.							_	_		_					
10	Dry	Water	NA	Pass	NA	NA	NA	NA	NA	10	Dry	Product	NA	Pass	NA	NA	NA	NA	NA
			-	ne out of alarm.	NIA	NTA	NIA	NIA	NT A	10	ъ	D 1 4	NIA	D	NTA	NTA	NTA	NTA	NIA
10 Sansa	Dry	Water	NA	Pass	NA	NA	NA	NA	NA	10	Dry	Product	NA	Pass	NA	NA	NA	NA	NA
NT	NT	NT	NT	ne out of alarm.  NT	NA	NA	NA	NA	NA	10	10	Product	Yes	Pass	NA	NA	NA	NA	NA
-											-								
NT	NT	NT	NT	NT	NA	NA	NA	NA	NA	NA	NA	None	No	Fail	NA	NA	NA	NA	NA
Senso NT	r tailed t NT	ine test, but NT		pany is out of busi NT	iness.So, ow NA	ner mig NA		nange tno NA	NA NA	ector gave the 20	owner 10	rwo weeks Product		-	NA	NA	NA	NA	NA
				·	IVA	INA	IVA	INA	IVA	20	10	Troduct	1 05	1 055	IVA	IVA	IVA	INA	INA.
Sens	or M	ake:	Red J	acket															
Sens	or Mo	del	RE	E400-203															
1	1	Water	NA	Pass	NA	NA	NA	NA	NA	NT	NT	NT	NT	NT	NA	NA	NA	NA	NA
1	1	Water	NA	Pass	NA	NA	NA	NA	NA	NT	NT	NT	NT	NT	NA	NA	NA	NA	NA
1	1	Water	NA	Pass	NA	NA	NA	NA	NA	NT	NT	NT	NT	NT	NA	NA	NA	NA	NA
1	1	Water	NA	Pass	NA	NA	NA	NA	NA	NT	NT	NT	NT	NT	NA	NA	NA	NA	NA
1	1	Water	NA	Pass	NA	NA	NA	NA	NA	NT	NT	NT	NT	NT	NA	NA	NA	NA	NA
1	1	Water	NA	Pass	NA	NA	NA	NA	NA	NT	NT	NT	NT	NT	NA	NA	NA	NA	NA
Sens	or M	ake:	Veede	er-Root															
Sens	or Mo	del	79	4380-320															
Unk		Unk	Unk		2	5	Water	Unk	Pass	383	1030	Product	Unk	Pass	NA	NA	NA	NA	NA
Unk	Unk	Unk	Unk	Unk	1	7	Water	Unk	Pass	395	962	Product	Unk	Pass	NA	NA	NA	NA	NA
Sens	or Mo	del	79	4380-322															
5	Unk	Water	NA	Pass	5	5	Water	Yes	Pass	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
				vating both low a	-				1 405	111	111	212	111	.11	111	111	111	111	
		rrea me se	, acti				at the ball												

Low water Test Froduct Testing Full Testing	Low Water Test	High Water Test	Product Testing	Flip Testing
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Resp	Rec	Alarm	PSD	Result	Resp	Rec	Alarm	PSD	Result	Resp	Rec	Alarm	PSD	Result	Resp	Rec	Alarm	PSD	Result
Senso	or Mod	lel	79	4380-341															
NT	NT	NT	NT	NT	5	1	Water	Yes	Pass	5	1	Product	Yes	Pass	NA	NA	NA	NA	NA
When	placed in	fuel, alarn	ns went	off as water - pump	shut-dowi	n worke	d; waste oil	sensor fa	iled, replaced an	d recorded	on sepa	rate sheet.							
10	10	Water	Yes	Pass	NA	NA	NA	NA	NA	10	10	Water	Yes	Fail	NA	NA	NA	NA	NA
Γechni	ician had	to clean th	e sensor	with a rag complete	ely (especi	ially in	the small wi	ndow at	sensor's center) b	efore fuel	could be	e detected.	After cl	eaning sensor did	detect fuel				
10	10	Water	Yes	Pass	NA	NA	NA	NA	NA	10	10	Water	Yes	Fail	NA	NA	NA	NA	NA
echni		to clean th	e sensor	with a rag complete	ely (especi	ially in	the small wi	ndow at	sensor's center) b		could be			C	l detect fuel	•			
.0	10	Water	Yes	Pass	NA	NA		NA	NA	10	10	Water	Yes		NA	NA	NA	NA	NA
				with a rag complete	J ( 1	-			<i>'</i>					Č					
Jnk	Unk	Unk	Unk	Unk	NA	NA	NA	NA	NA	NA	NA	None	Unk	Fail	NA	NA	NA	NA	NA
Jnk	Unk	Unk	Unk	Unk	NA	NA	NA	NA	NA	2	2	Product	Unk	Pass	NA	NA	NA	NA	NA
Jnk	Unk	Unk	Unk	Unk	NA	NA	NA	NA	NA	2570	4240	Product	Unk	Pass	NA	NA	NA	NA	NA
Jnk	Unk	Unk	Unk	Unk	NA	NA	NA	NA	NA	5	5	Product	Unk	Pass	NA	NA	NA	NA	NA
3	3	Water	Yes	Pass	NA	NA	NA	NA	NA	3	3	Product	Yes	Pass	NA	NA	NA	NA	NA
2	1	Water	NA	Pass	NA	0	NA	NA	NA	13	Unk	Water	No	Fail	NA	NA	NA	NA	NA
	sets wat	er alarm fo	r produc	et test. After testing	the sensor	r was re	placed and t	he new s	ensor was setting		ılarm.								
		NT	NT	NT	5	1	Water	Yes	Pass	5	1	Product	Yes	Pass	NA	NA	NA	NA	NA
NΤ	NT	NT	NT	NT	5	1	Water	Yes	Pass	5	1	Product	Yes	Pass	NA	NA	NA	NA	NA
JT	NT	NT	NT	NT	NA	NA	NA	NA	NA	Unk	Unk	None	No	Fail	NA	NA	NA	NA	NA
Replac	ed with s	same type o	of sensor	f															
3	2	Both		Pass	NA	NA	NA	NA	NA	3	2	Both	Yes	Pass	NA	NA	NA	NA	NA
Sensor	had been	n programr	ned to g	ive the same alarm i	in water ar	nd produ	ıct.												
3	2	Both	Yes	Pass	NA	NA	NA	NA	NA	3	2	Both	Yes	Pass	NA	NA	NA	NA	NA
Sensor	had been	n programr	ned to g	ive the same alarm i	in water ar	nd produ	ıct.												
3	2	Both	Yes	Pass	NA	NA	NA	NA	NA	3	2	Both	Yes	Pass	NA	NA	NA	NA	NA
Sensor	had been	n programr	ned to g	ive the same alarm i	in water ar	nd produ	ıct.												
3	3	Water		Pass	NA	NA		NA	NA	3	3	Water		Fail	NA	NA	NA	NA	NA
			. Since	pump shuts down fo	or product			ency did	not require senso	r to be cha					am as non-o				
12	1	Water	NA	Pass	NA	0	NA	NA	NA	13	Unk	Product	Yes	Pass	NA	NA	NA	NA	NA
Jnk	Unk	Unk	Unk	Unk	NA	NA	NA	NA	NA	2	2	Product	Unk	Pass	NA	NA	NA	NA	NA
2	1	Water	NA	Pass	NA	0	NA	NA	NA	12	Unk	Water	No	Fail	NA	NA	NA	NA	NA
Sensor	sets wat	er alarm fo	r produc	et test. After testing	, sensor w	as repla	ced and the	new sens	sor was setting th	e right alar	m.								
NT	NT	NT	NT	NT	NA	0	NA	NA	NA	13	Unk	Water	NA	Fail	NA	NA	NA	NA	NA
Sensor	was test	ed with bo	th unlead	ded gasoline and wa	aste oil. Bo	oth case	s, water alar	ms were	observed. Sensor	was not a	pproved	for use in	waste oi	<ol> <li>After testing, s</li> </ol>	ensor was r	eplaced	and it passe	d the pro	oduct test.
Jnk	Unk	Unk	Unk	Unk	NA	NA	NA	NA	NA	NA	NA	None	Unk	Fail	NA	NA	NA	NA	NA

							n muce 1					muci 1 cs					up resun	-	
Resp	Rec	Alarm	PSD	Result	Resp	Rec	Alarm	PSD	Result	Resp	Rec	Alarm	<b>PSD</b>	Result	Resp	Rec	Alarm	PSD	Result
nk	Unk	Unk	Unk	Unk	NA	NA	NA	NA	NA	4	10	Product	Unk	Pass	NA	NA	NA	NA	NA
Jnk	Unk	Unk	Unk	Unk	NA	NA	NA	NA	NA	417	1055	Product	Unk	Pass	NA	NA	NA	NA	NA
	3	Water	Yes	Pass	NA	NA	NA	NA	NA	3	3	Water	Yes	Fail	NA	NA	NA	NA	NA
etecte	ed produ	ict as water	r. Since j	oump shuts down	for product	or wate	r, Local Age	ency did	not require sen	sor to be cha	nged. C	wner will i	replace	sensor or reprogr	am as non-d	iscrimi	nating.		
Senso	or Mo	del	79	4380-350															
	5	Water	NA	Pass	5	5	Water	Yes	Pass	360	465	Product	Yes	Pass	NA	NA	NA	NA	NA
echni)	cian left	t sensor in j	product f	or 2min & 45sec.	He rinsed t	he sense	or with soap	y water a	ıfter alarm activ	vated to spee	d up rec	overy time.							
	1	Water	NA	Pass	5	5	Water	Yes	Pass	360	765	Product	Yes	Pass	NA	NA	NA	NA	NA
echni)	cian left	t sensor in j	product f	or 2min & 45sec.	He rinsed t	he sense	or with soap	y water a	ıfter alarm activ	vated to spee	d up rec	overy time.							
	2	Water	NA	Pass	2	2	Water	Yes	Pass	300	480	Product	Yes	Pass	NA	NA	NA	NA	NA
2	2	Water	NA	Pass	2	Unk	Water	Yes	Pass	480	Non	Product	Yes	Fail	NA	NA	NA	NA	NA
ensor	did not	come out o	of alarm a	after being tested in	n product, s	so techn	ician replace	ed it.											
	2	Water	NA	Pass	None	Non	None	No	Fail	none	Unk	None	No	Fail	NA	NA	NA	NA	NA
ensor	did not	respond du	ıring higl	n water or product	testing. Te	echnicia	n suspected	wiring p	roblem, since s	ensor was re	placed b	ut test resu	lts did 1	not change.					
	2	Water	NA	Pass	2	2	Water	Yes	Pass	180	NA	Product	Yes	Pass	NA	NA	NA	NA	NA
	2	Water	NA	Pass	2	2	Water	No	Fail	Unk	Unk	Product	No	Fail	NA	NA	NA	NA	NA
echnie)	cian sus	pected a pr	oblem w	ith the wiring at th	is site.														
;	5	Water	NA	Pass	5	5	Water	NA	Pass	480	300	Product	Yes	Pass	NA	NA	NA	NA	NA
echni	cian left	t sensor in j	product f	or 2min & 45sec.	He rinsed t	he sense	or with soap	y water a	ıfter alarm activ	vated to spee	d up rec	overy time.							
	1	Water	NA	Pass	5	5	Water	Yes	Pass	330	600	Product	Yes	Pass	NA	NA	NA	NA	NA
Techni	cian left	t sensor in j	product f	or 2min & 45sec.	He rinsed t	he sense	or with soap	y water a	ıfter alarm activ	vated to spee	d up rec	overy time.							
i	Unk	Water	NA	Pass	2	2	Water	Yes	Pass	300	600	Product	Yes	Pass	NA	NA	NA	NA	NA
Sensors	s were l	eft in fuel f	or 3 min	utes. They alarm 2	2-5 minutes	after be	eing pulled f	rom fuel	. This speeds u	ip recovery t	ime.								
	5	Water	NA	Pass	5	5	Water	Yes	Pass	300	360	Product	Yes	Pass	NA	NA	NA	NA	NA
Techni	cian left	t sensor in j	product f	for 2min & 45sec.	He rinsed t	he sense	or with soap	y water a	ıfter alarm activ	vated to spee	d up rec	overy time.							
	5	Water		Pass	5	5	Water	Yes	Pass	330		Product		Pass	NA	NA	NA	NA	NA
Techni	cian left	t sensor in j	product f	or 2min & 45sec.	He rinsed t	he sense	or with soap	y water a	ıfter alarm activ	vated to spee	d up rec	overy time.							
5	5	Water	NA	Pass	5	5	Water	NA	Pass	300	540	Product	Yes	Pass	NA	NA	NA	NA	NA
		t sensor in j	product f	or 2min & 45sec.			or with soap	y water a		-	d up rec	overy time.							
5	5	Water	NA	Pass	5	5	Water	NA	Pass	720	360	Product	Yes	Pass	NA	NA	NA	NA	NA
		-		or 2min & 45sec.				•		-	-	•							
	5	Water		Pass	5	5	Water	NA	Pass	360		Product		Pass	NA	NA	NA	NA	NA
		-		or 2min & 45sec.				•		-	-	•							
	Unk	Water		Pass	2	2	Water	Yes	Pass	420	720	Product	Yes	Pass	NA	NA	NA	NA	NA
				utes. They alarm 2			- 1		•										
1	1	Water	NA	Pass	5	5	Water	Yes	Pass	300	540	Product	Yes	Pass	NA	NA	NA	NA	NA

**Product Testing** 

High Water Test

Low Water Test

Flip Testing

	Lo	w Water T	Test			Hig	h Water T	est			Pr	oduct Tes	ting			i	Flip Testin	g	
Resp	Rec	Alarm	PSD	Result	Resp	Rec	Alarm	PSD	Result	Resp	Rec	Alarm	PSD	Result	Resp	Rec	Alarm	PSD	Result
7	1	Water	NA	Pass	3	1	Water	Yes	Pass	360	720	Product	Yes	Pass	NA	NA	NA	NA	NA
For pr	oduct tes	st, sensor w	as left in	fuel for 3 minutes.															
NT	NT	NT	NT	NT	5	1	Water	Yes	Pass	360	900	Product	Yes	Pass	NA	NA	NA	NA	NA
NT	NT	NT	NT	NT	5	1	Water	Yes	Pass	360	900	Product	Yes	Pass	NA	NA	NA	NA	NA
NT	NT	NT	NT	NT	5	1	Water	Yes	Pass	360	900	Product	Yes	Pass	NA	NA	NA	NA	NA
NT	NT	NT	NT	NT	5	1	Water	Yes	Pass	840	Unk	Product	Yes	Pass	NA	NA	NA	NA	NA
Takes	longer fo	or this sens	or to alaı	m because often lef	ft sitting in	n water.													
7	1	Water	NA	Pass	5	1	Water	Yes	Pass	300	300	Product	Yes	Pass	NA	NA	NA	NA	NA
For pr	oduct tes	st, sensor w	as left in	fuel for 3 minutes.															
7	1	Water	NA		4	1	Water	Yes	Pass	360	590	Product	Yes	Pass	NA	NA	NA	NA	NA
		· ·		fuel for 3 minutes.	_				_					_					
7	1	Water	NA		5	1	Water	Yes	Pass	360	660	Product	Yes	Pass	NA	NA	NA	NA	NA
For pro Unk		st, sensor w Unk	as left in Unk	fuel for 3 minutes. Unk	4	5	Water	Unk	Pass	238	3531	Product	Unk	Pass	NA	NA	NA	NA	NA
					6								_						
7 For <b>nr</b>	1 aduat tas	Water	NA	Pass fuel for 3 minutes.	0	1	Water	Yes	Pass	360	1020	Product	Yes	Pass	NA	NA	NA	NA	NA
5 For pr	Unk	Water	NA	Pass	2	2	Water	Yes	Pass	300	600	Product	Ves	Pass	NA	NA	NA	NA	NA
Sensor				utes. They alarm 2-								Trouder	105	1 435	1111	1171	1111	1111	1411
	Unk	Unk	Unk	•	2	10	Water	Unk	Pass	365		Product	Unk	Pass	NA	NA	NA	NA	NA
Unk	Unk	Unk	Unk	Unk	4	7	Water	Unk	Pass	357	890	Product	Unk	Pass	NA	NA	NA	NA	NA
2	2	Water	NA	Pass	2	2	Water	No	Fail	Unk	Unk	Product	No	Fail	NA	NA	NA	NA	NA
				roblem with the rela			***************************************	110	1 411	Olik	ОПК	Troudet	110	1 411	1171	1171	1111	1111	1111
	Unk	Unk		Unk	3	9	Water	Unk	Pass	206	1390	Product	Unk	Pass	NA	NA	NA	NA	NA
5	Unk	Water	NA	Pass	2	2	Water	Yes	Pass	300	600	Product	Yes	Pass	NA	NA	NA	NA	NA
				utes. They alarm 2-	_							1104401	100	1 400	1111		1,112		1111
5	5	Water		Pass	5	5	Water	NA	Pass	420	420	Product	Yes	Pass	NA	NA	NA	NA	NA
Techn	ician left	t sensor in j	product f	for 2min & 45sec. H	He rinsed t	the sense	or with soap	y water a	fter alarm acti	vated to spee	d up rec	overy time.							
Unk	Unk	Unk	Unk	Unk	5	10	Water	Unk	Pass	318	1189	Product	Unk	Pass	NA	NA	NA	NA	NA
5	Unk	Water	NA	Pass	2	2	Water	Yes	Pass	420	720	Product	Yes	Pass	NA	NA	NA	NA	NA
Sensor	rs were le	eft in fuel f	or 3 min	utes. They alarm 2-	5 minutes	after be	ing pulled f	rom fuel	This speeds u	up recovery t	ime.								
7	1	Water	NA	Pass	6	1	Water	Yes	Pass	300	483	Product	Yes	Pass	NA	NA	NA	NA	NA
		· ·		fuel for 3 minutes.															
Unk	Unk	Unk	Unk	Unk	4	9	Water	Unk	Pass	3009	6120	Product	Unk	Pass	NA	NA	NA	NA	NA
5	Unk	Water	NA	Pass	2	2	Water	Yes	Pass	300	600	Product	Yes	Pass	NA	NA	NA	NA	NA
Sensor	rs were le	eft in fuel f	or 3 min	utes. They alarm 2-	-5 minutes	after be	ing pulled f	rom fuel	This speeds i	up recovery t	ime.								
Sens	or Mo	del	79	4380-352															
3	1	Both	Yes	Pass	3	1	Both	Yes	Pass	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT

	LU	w mater 1	CSi			1118	n muci 1	CSi			11	ounci 1 es	····s				up resun	5	
Resp	Rec	Alarm	<b>PSD</b>	Result	Resp	Rec	Alarm	PSD	Result	Resp	Rec	Alarm	<b>PSD</b>	Result	Resp	Rec	Alarm	PSD	Result
6	1	Both	Yes	Pass	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Sensors	were t	ested as a n	on-discri	iminating float	sensor.														
6	1	Both	Yes	Pass	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Sensors	were t	ested as a n	on-discri	iminating float	sensor.														
	NT	NT	NT		5	1	Both	Yes	Pass	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
				fill sump, in the		et.													
	NT	NT	NT		1	1	Both	Yes	Pass	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
				fill sump, in the					_										
	NT	NT	NT		5	1	Both	Yes	Pass	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
				fill sump, in the			D 4	37	D	NIT	NIT	NIT	NIT	NT	NT	NIT	NT	NT	NE
3		Both		Pass	3	1	Both	Yes	Pass	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
10 5		Water		Pass	10	5	Water	Yes	Pass	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
_				gh liquid alarms				-											
10 5		Water		Pass	10	5	Water	Yes	Pass	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
				gh liquid alarms						> 177			> 100	N. T.		> 100			> vm
10 5		Water		Pass	10	5	Water	Yes	Pass	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
			•	gh liquid alarms						NIT	NIT	NIT	NIT	NT	NT	NIT	NT	NT	NT
	5	Water		Pass	15 T. 1	5	Water	Yes	Pass	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
-		Water		gh liquid alarms Pass	s. Technician (		Water	or in pro Unk	duct. water in Pass	sump was n	_	enougn to a NT		ne alarm. NT	NT	NT	NT	NT	NT
				rass nating sensors in									IN I	IN I	NI	IN I	NI	IN I	INI
-	Jnk	Water		Pass	5 5		Water	Unk	Pass	NT		NT	NT	NT	NT	NT	NT	NT	NT
				nating sensors in									111	111	111	111	111	111	NI
Unk U		None	No	Fail	3	1	Both	Yes	Pass	NT	NT		NT	NT	NT	NT	NT	NT	NT
														does the routine					
functina				(	.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	P ·									P	-P P	,,,		
Unk U	Unk	Unk	Unk	Unk	10	17	Water	Unk	Pass	425	2435	Product	Unk	Pass	NT	NT	NT	NT	NT
Cleaned	in Col	leman Fuel.																	
Unk U	Unk	Unk	Unk	Unk	8	16	Water	Unk	Pass	446	1548	Product	Unk	Pass	NT	NT	NT	NT	NT
Unk U	Unk	Unk	Unk	Unk	12	18	Water	Unk	Pass	468	960	Product	Unk	Pass	NT	NT	NT	NT	NT
Unk U	Unk	Unk	Unk	Unk	4	10	Water	Unk	Pass	452	960	Product	Unk	Pass	NT	NT	NT	NT	NT
Unk U	Unk	Unk	Unk	Unk	6	11	Water	Unk	Pass	NA	NA	Water	Unk	Fail	NT	NT	NT	NT	NT
Unk U	Unk	Unk	Unk	Unk	NT	NT	NT	NT	NT	543	570	Product	Unk	Pass	NT	NT	NT	NT	NT
Unk U		Unk		Unk	10	18	Water	Unk	Pass	275		Product			NT	NT	NT	NT	NT
		leman Fuel.		Jiik	10	10	11 4101	CIIK	1 400	213	2373	1100001	CIIK	- 400	111	111	111	111	
6		Both		Pass	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
				iminating float			- 1 -		- 1 -	- 1 -				- 1 -		.,.	- 1 -		
Unk U		Unk		Unk	7	13	Water	Unk	Pass	425	1413	Product	Unk	Pass	NT	NT	NT	NT	NT
					·				****										<u> </u>

**Product Testing** 

High Water Test

Low Water Test

Flip Testing

	20	w water 1					n muci 1					ounci 1 es	O			•	•	•	
Resp	Rec	Alarm	<b>PSD</b>	Result	Resp	Rec	Alarm	PSD	Result	Resp	Rec	Alarm	<b>PSD</b>	Result	Resp	Rec	Alarm	PSD	Result
Jnk	Unk	Unk	Unk	Unk	6	16	Water	Unk	Pass	435	2040	Product	Unk	Pass	NT	NT	NT	NT	NT
nk	Unk	Unk	Unk	Unk	9	22	Water	Unk	Pass	530	2040	Product	Unk	Pass	NT	NT	NT	NT	NT
		leman Fuel							_										
	Unk	Unk leman Fuel		Unk	4	14	Water	Unk	Pass	355	1640	Product	Unk	Pass	NT	NT	NT	NT	NT
	Unk	Unk		Unk	5	13	Water	Unk	Pass	414	1240	Product	Unk	Pass	NT	NT	NT	NT	NT
Jnk	Unk	Unk	Unk	Unk	5	12	Water	Unk	Pass	379	1143	Product	Unk	Pass	NT	NT	NT	NT	NT
Jnk	Unk	Unk	Unk	Unk	6	16	Water	Unk	Pass	429	1166	Product	Unk	Pass	NT	NT	NT	NT	NT
Jnk	Unk	Unk	Unk	Unk	8	21	Water	Unk	Pass	422	1320	Product	Unk	Pass	NT	NT	NT	NT	NT
Jnk	Unk	Unk	Unk	Unk	5	12	Water	Unk	Pass	425	1271	Product	Unk	Pass	NT	NT	NT	NT	NT
Jnk	Unk	Unk	Unk	Unk	4	9	Water	Unk	Pass	483	1229	Product	Unk	Pass	NT	NT	NT	NT	NT
Jnk	Unk	Unk	Unk	Unk	7	13	Water	Unk	Pass	299	573	Product	Unk	Pass	NT	NT	NT	NT	NT
Jnk	Unk	Unk	Unk	Unk	4	13	Water	Unk	Pass	318	481	Product	Unk	Pass	NT	NT	NT	NT	NT
Jnk	Unk	Unk	Unk	Unk	4	11	Water	Unk	Pass	397	690	Product	Unk	Pass	NT	NT	NT	NT	NT
Jnk	Unk	Unk	Unk	Unk	6	10	Water	Unk	Pass	489	1190	Product	Unk	Pass	NT	NT	NT	NT	NT
Jnk	Unk	Unk	Unk	Unk	5	11	Water	Unk	Pass	539	1631	Product	Unk	Pass	NT	NT	NT	NT	NT
Jnk	Unk	Unk	Unk	Unk	4	9	Water	Unk	Pass	474	1299	Product	Unk	Pass	NT	NT	NT	NT	NT
Jnk	Unk	Unk	Unk	Unk	9	15	Water	Unk	Pass	495	1256	Product	Unk	Pass	NT	NT	NT	NT	NT
Jnk	Unk	Unk	Unk	Unk	6	14	Water	Unk	Pass	Unk	813	Product	Unk	Pass	NT	NT	NT	NT	NT
Jnk	Unk	Unk	Unk	Unk	6	16	Water	Unk	Pass	335	2010	Product	Unk	Pass	NT	NT	NT	NT	NT
Ink	Unk	Unk	Unk	Unk	2	12	Water	Unk	Pass	470	1078	Product	Unk	Pass	NT	NT	NT	NT	NT
Jnk	Unk	Unk	Unk	Unk	4	11	Water	Unk	Pass	350	3499	Product	Unk	Pass	NT	NT	NT	NT	NT
Jnk	Unk	Unk	Unk	Unk	5	10	Water	Unk	Pass	459	1769	Product	Unk	Pass	NT	NT	NT	NT	NT
Jnk	Unk	Unk	Unk	Unk	6	14	Water	Unk	Pass	462	2206	Product	Unk	Pass	NT	NT	NT	NT	NT
Jnk	Unk	Unk	Unk	Unk	5	11	Water	Unk	Pass	453	930	Product	Unk	Pass	NT	NT	NT	NT	NT
Jnk	Unk	Unk	Unk	Unk	6	13	Water	Unk	Pass	440	1140	Product	Unk	Pass	NT	NT	NT	NT	NT
Jnk	Unk	Unk	Unk	Unk	8	19	Water	Unk	Pass	420	1851	Product	Unk	Pass	NT	NT	NT	NT	NT
nk	Unk	Unk	Unk	Unk	5	13	Water	Unk	Pass	540	1760	Product	Unk	Pass	NT	NT	NT	NT	NT
Jnk	Unk	Unk	Unk	Unk	9	11	Water	Unk	Pass	360	1500	Product	Unk	Pass	NT	NT	NT	NT	NT
nk	Unk	Unk	Unk	Unk	8	21	Water	Unk	Pass	354	1807	Product	Unk	Pass	NT	NT	NT	NT	NT
ЛТ	NT	NT	NT	NT	5	5	Water	Yes	Pass	NT	NT	NT	NT	NT	5	5	Water	Yes	Pass

**Product Testing** 

High Water Test

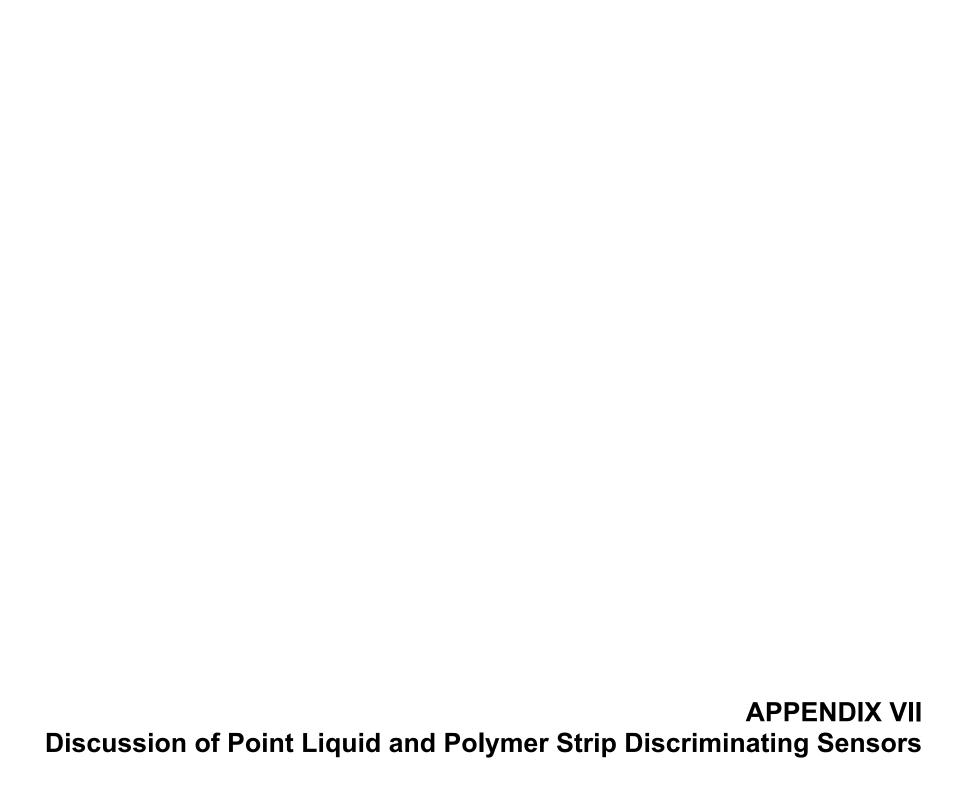
Low Water Test

Flip Testing

	Lo	w Water T	Test			Hig	h Water T	est			Pro	oduct Tes	ting			1	Flip Testing	g	
Resp	Rec	Alarm	PSD	Result	Resp	Rec	Alarm	PSD	Result	Resp	Rec	Alarm	PSD	Result	Resp	Rec	Alarm	PSD	Result
NT	NT	NT	NT	NT	5	5	Water	Yes	Pass	NT	NT	NT	NT	NT	3	5	Water	Yes	Pass
Senso	r was pro	grammed i	for PSD o	on high-liquid only,	not produ	ct. Tec	hnician re-p	rogramm	ed for PSD on lo	w, high, ar	ıd produ	et.							
NT	NT	NT	NT	NT	5	5	Water	Yes	Pass	NT	NT	NT	NT	NT	3	5	Water	Yes	Pass
Senso		grammed i	for PSD o	on high-liquid only,	not produ		hnician re-p	_	ed for PSD on lo	w, high, ar	ıd produ	ct.							
NT	NT	NT	NT	NT	5	5	Water	Yes	Pass	NT	NT	NT	NT	NT	5	5	Water	Yes	Pass
	•	-		on high-liquid only,	•		•	-			•		N TOTAL	N/T	_	** •	***	3.7D	
NT	NT	NT	NT	NT	5	5	Water	Yes	Pass	NT	NT	NT	NT	NT	5	Unk	Water	NP	Pass
10	2	Water	NA	Pass	2	2	Water	Yes	Pass	260	Unk	Product	Yes	Pass	NT	NT	NT	NT	NT
_		or "high va			_	_	***				> 17T	> vm	N TOTAL	N/T	_	** •	***	3.7D	
NT	NT	NT	NT	NT	5	5	Water	Yes	Pass	NT	NT	NT	NT	NT	5	Unk	Water	NP	Pass
3	3	Water	NA	Pass	2	2	Water	Yes	Pass	240		Product	Yes	Pass	NT	NT	NT	NT	NT
_			•	". Sensor intermitte	-				C					0			> rm	> 17T	<b>.</b>
Unk	Unk	Unk	Unk	Unk	5	14	Water	Unk	Pass	730	1276	Product	Unk	Pass	NT	NT	NT	NT	NT
Unk	Unk	Unk	Unk	Unk	13	21	Water	Unk	Pass	480	600	Product	Unk	Pass	NT	NT	NT	NT	NT
NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Wirin	g malfun	U																	
NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	g malfun	_																	
NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
NT	NT	NT	NT	NT	60	5	Water	Yes	Pass	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
NT	NT	NT	NT	NT	NA	NA	NA	NA	NA	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Had 2	bad rela	ys that had	to be fix	ed.															
NT	NT	NT	NT	NT	10	5	Water	Yes	Pass	NT	NT	NT	NT	NT	5	Unk	Water	NP	Pass
Unk	Unk	Unk	Unk	Unk	10	24	Water	Unk	Pass	520	1769	Product	Unk	Pass	NT	NT	NT	NT	NT
NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Had 2	bad rela	ys that had	to be fix	ed.															
Unk	Unk	Unk	Unk	Unk	13	24	Water	Unk	Pass	420	1978	Product	Unk	Pass	NT	NT	NT	NT	NT
Unk	Unk	Unk	Unk	Unk	18	25	Water	Unk	Pass	385	1470	Product	Unk	Pass	NT	NT	NT	NT	NT
Unk	Unk	Unk	Unk	Unk	12	25	Water	Unk	Pass	412	1920	Product	Unk	Pass	NT	NT	NT	NT	NT
Unk	Unk	Unk	Unk	Unk	12	25	Water	Unk	Pass	400	1695	Product	Unk	Pass	NT	NT	NT	NT	NT
Unk	Unk	Unk	Unk	Unk	15	28	Water	Unk	Pass	335	2281	Product	Unk	Pass	NT	NT	NT	NT	NT
NT	NT	NT	NT	NT	5	5	Water	Yes	Pass	NT	NT	NT	NT	NT	5	5	Water	Yes	Pass
Senso	r was pro	grammed t	for PSD o	on high-liquid only,	not produ	ct. Tec	hnician re-pi	rogramm	ed for PSD on lo	w, high, ar	ıd produ	ct.							
Unk	Unk	Unk	Unk	Unk	16	30	Water	Unk	Pass	Unk	Unk	Product	Unk	Pass	NT	NT	NT	NT	NT
Emer	gency shu	ut-off activa	ated duri	ng testing, so no dat	a was ava	ilable.													
Unk	Unk	Unk	Unk	Unk	8	19	Water	Unk	Pass	420	1625	Product	Unk	Pass	NT	NT	NT	NT	NT
	-		-		-				-	-				-				-	<del></del>

Low Water Test	High Water Test	Product Testing	Flip Testing
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Resp	Rec	Alarm	<b>PSD</b>	Result	Resp	Rec	Alarm	PSD	Result	Resp	Rec	Alarm	<b>PSD</b>	Result	Resp	Rec	Alarm	<b>PSD</b>	Result
Unk	Unk	Unk	Unk	Unk	9	19	Water	Unk	Pass	NA	NA	None	Unk	Fail	NT	NT	NT	NT	NT
Unk	Unk	Unk	Unk	Unk	6	15	Water	Unk	Pass	600	2120	Product	Unk	Pass	NT	NT	NT	NT	NT
Unk	Unk	Unk	Unk	Unk	10	18	Water	Unk	Pass	600	2120	Product	Unk	Pass	NT	NT	NT	NT	NT
15	Unk	Water	NA	Pass	5	Unk	Water	Yes	Pass	300	Unk	Product	Yes	Pass	NT	NT	NT	NT	NT
15	Unk	Water	NA	Pass	6	Unk	Water	Yes	Pass	390	Unk	Product	Yes	Pass	NT	NT	NT	NT	NT
15	2	Water	NA	Pass	15	3	Water	Yes	Pass	270	Unk	Product	Yes	Pass	NT	NT	NT	NT	NT
2	2	Product	Yes	Pass	2	2	Product	Yes	Pass	3	Unk	Product	Yes	Pass	NT	NT	NT	NT	NT
Programmed for "high vapor mode". Sensor was saturated with product vapors, so any liquid moving low or high float registrered as a product alarm.																			
Unk	Unk	Unk	Unk	Unk	16	41	Water	Unk	Pass	450	1559	Product	Unk	Pass	NT	NT	NT	NT	NT



## **Point Liquid and Polymer Strip Discriminating Sensors**

Point liquid type sensors use solid state electronics, which measure a particular physical property or properties of liquid that contacts the detection element. An example is capacitance change sensors, where liquid contacting the detection element acts as the dielectric in a capacitor. Air (no liquid present at sensor), hydrocarbon-based liquids, and water each have distinctly different dielectric constants. A capacitance change sensor can detect this and respond differently when dry, or when exposed to water or hydrocarbons. Different responses from the sensor are interpreted by the control panel, which activates the appropriate alarm.

Point liquid discriminating sensors are capable of responding only to liquids directly in contact with the detection element. This means that product floating on water will produce a water alarm if only the water is in contact with the detection element. The detection elements are usually quite small, meaning that it does not take a great deal of water to potentially mask a product release. Point liquid discriminating sensors tend to be smaller than the polymer strip type, and contain no moving parts. These attributes allow them to be installed in a variety of orientations, and in tight spaces (such as a tank interstice) where polymer strip sensors would not fit. Response time for this type of sensor varies by manufacturer and model, but is generally quick (less than 1 minute).

In contrast to point liquid discriminating sensors, polymer strip sensors use two detection elements combined in one housing to discriminate between product and water\*. The first detection element is a float switch or ultrasonic detector that will activate a "low liquid level" alarm when in contact with any liquid. It is located near the bottom of the sensor, and generally has a quick response time (less than 1 minute). The second detection element is a hydrocarbon-sensing cable or strip that will activate a "product" alarm when exposed to hydrocarbon-based product. It will not respond to water. The cable or strip typically runs from the bottom to the top of the sensor, and response times vary between approximately 5 minutes and 20 minutes in unleaded fuel (may be 12 hours or more in diesel fuel).

It is only by combining the float or ultrasonic liquid-sensing element with the hydrocarbon-sensing element (cable or strip) that the polymer strip type sensor is able to discriminate between product and water. A liquid entering the area monitored by the sensor will first contact the lowest float or ultrasonic detection element, activating a "low liquid level" alarm. This alarm alerts the UST operator that liquid is present in the monitored area. If the liquid present is gasoline, the hydrocarbon-sensing element will activate a "product" alarm approximately 5 to 20 minutes later (may be 12 hours or more for diesel fuel). In this event, the UST operator knows that product is present in the area monitored by the sensor, not just water.

Polymer strip discriminating sensors offer the benefit of being able to detect a layer of hydrocarbon floating on water, as long as the water level is in contact with the hydrocarbon-sensing strip. This makes them well suited for locations where water ingress is common. Many (but not all) of these sensors have an additional float or ultrasonic liquid-sensing element located at the top end of the hydrocarbon-sensing strip. This element activates a "high liquid level" alarm, which indicates that the liquid level has exceeded the height of the hydrocarbon-sensing strip. Once water has reached this level, subsequent product releases may float above and fail to contact the hydrocarbon-sensing strip, resulting in a missed detection. Polymer strip type sensors are less likely to miss a layer of product on water than point liquid discriminating sensors, but it is still a possibility that UST operators and inspectors should be aware of.

\*

<sup>\*</sup> Examples of polymer strip discriminating sensors include Emco Electronics models Q0003-002 and -003, Incon models TSP-DDS and TSP-DTS, and Veeder-Root models 794380-320, -322, -350, and -352).